IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication AUGUST 17, 1961

Larry Williams

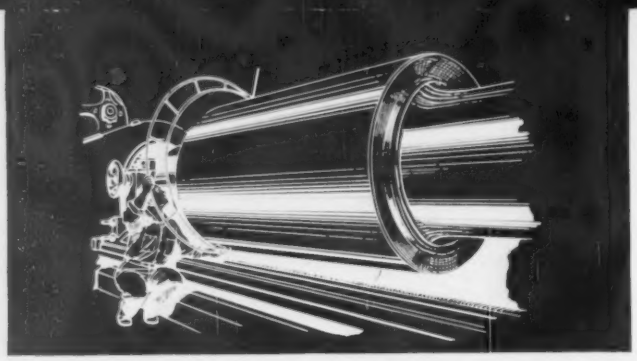
★ Midvale-Heppenstall's Casey Reports:

How Vacuum Melters Aim For Wider Markets p. 93

Stampers: Tipoff of an Upturn? p. 67

Architects Study Metals' Use p. 72

Digest of the Week p. 2-3



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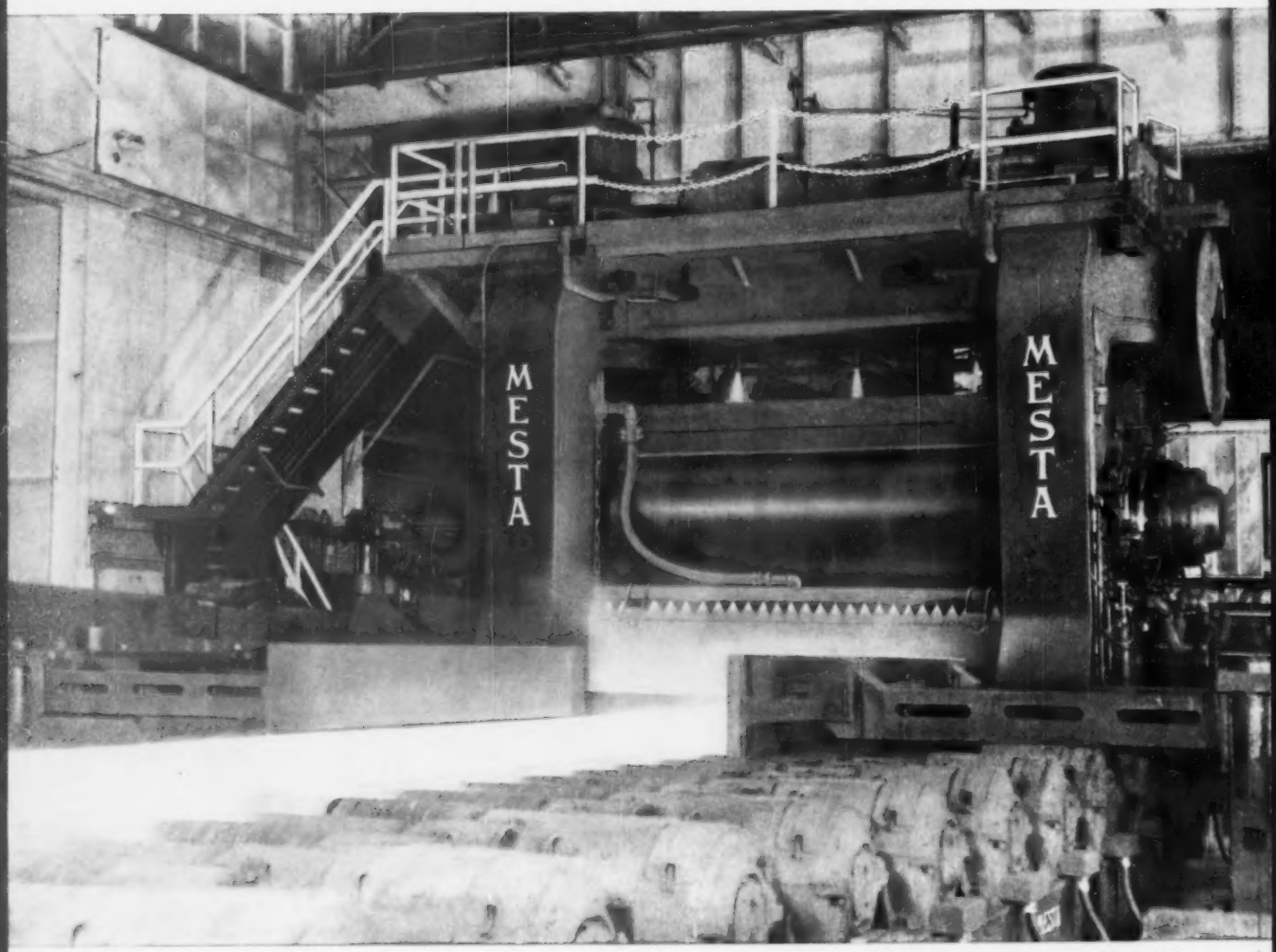

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Digest of the Week in Metalworking

News of the Industry

Stamping Sales Surge Higher: Big question: How long will it last? 67
Foreign Cars Miss U. S. Goals: Sales lag behind earlier forecasts. 69
SAE Steel Grades May Start Trend: Performance is main factor now. 70
Tinplate Gets Another Squeeze: New tactic in fight for can market. 71
Creative Managers Wanted: More flexible talent needed in 1960's. 79

Engineering-Production Developments

Vacuum Furnace Melts Huge Ingots: Turns out record-size forgings. 93
New Plastic Challenges Paint: Tedlar sets sights on metalfinishing. 95
Punched Cards Cull Facts: System cuts foundry's production costs. 98
Electrical Current Curbs Corrosion: Builds up protective coatings. 100
Plant Painting Reaps Dividends: Extends life of vital equipment. 102
Riveting Reduces Assembly Costs: Modern methods yield big rewards. 104
Forgers Tame Tungsten Alloys: Hold tight tolerances on thin shapes. 106

Markets and Price Trends

Metals Map Building Campaign: Contest march of other materials. 72
Precision Production Needed: Space race challenges tool builders. 85
Steel Summary: Market strengthens despite automotive setbacks. 145
Electroplating Pickup Grows: New gains after lagging 1961 start. 146
Nonferrous: Aluminum takes sharper aim on transportation market. 154

Editorial
Reading the Tea Leaves:
There Are Tough Jobs Ahead 5

Metalworking Newsfront
Business Forecast 7
Metalworking Labor 9
Washington 11
International 13
Techfront 15
Market-Planning Digest 65
Report to Management 79
Spacefront 91
Steel Summary 145

Industry Trends
Automotive 81
West Coast 83
Machine Tools 85
Purchasing 146

Markets and Prices
Price Section 145
Steel Products 148
Ferrous Scrap 150
Nonferrous 154

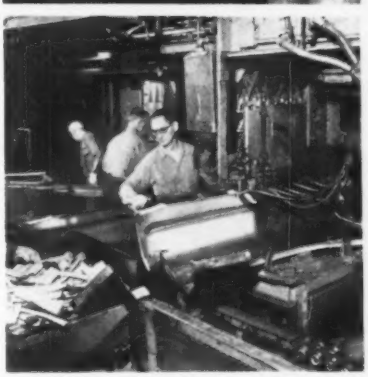
Departments
Letters 21
Fatigue Cracks 23
Meetings and Exhibits 25
Industrial Briefs 76
Men in Metalworking 86
Design Digest 108
Technical Literature 131
New Patents 133
New Equipment 136
Clearing House 164

ADVERTISING INDEX 168

Special This Week

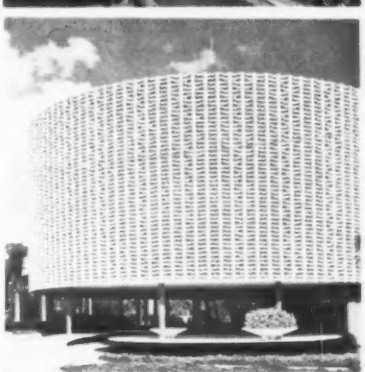
Furnace Vacuum-Melts Huge Ingots

Vacuum-melted forgings got a healthy size boost when Midvale-Heppenstall Co.'s new 40-ft tall, consumable-electrode vacuum-melting furnace began turning out 40-in. diam ingots. Midvale's H. H. Casey, special projects manager, says the new equipment takes 25 hours to make a 25-ton ingot. p. 93



Stamping Sales: How Much Upturn?

After a slow first half, stamping orders are picking up speed. Recent sales gains have been far above earlier forecasts, with most major users buying. Stampers are hopeful the upsurge will continue. If it does, total sales could top 1960 levels. p. 67



Metals Fight Back in Building Field

Metals have been falling out of favor with architects in the building field. Aggressive promotion by the concrete industry has contributed to the trend. Last week, representatives of the architectural metals industry decided to fight back. p. 72

Next Week

Team Turns Ideas Into New Products

The team approach is used to develop new products at Portable Electric Tool Co., Chicago. Top management works directly with three teams, comprising one engineer and three designers. They take ideas for light power tools and turn them into new products.

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Reading the Tea Leaves: There Are Tough Jobs Ahead

The President wants no panic buying. That is why his speech was low-pitched. That is why there is no scurrying and rushing around in Washington—publicly.

But the wheels are turning in Washington—and in the executive suites. The gears are meshing quietly—but they are meshing.

It will be a while before the mass of the people and management realize what is ahead. Fortunately, there is no hysteria, no panic. And for the time being, there is orderliness.

The White House needs no fancy control measures. It has the authority it needs except for price controls. But, as we have indicated before, the Administration has price controls firmly in mind —if things get too wild.

It is the duty of efficient management to review its buying practices, its inventory policies—and its pricing actions. By review, we mean updating reports and surveys made only a month ago.

Sooner or later, the needs of the government will impinge on some industrial or consumer areas. Something will give—and it won't be defense needs.

There will be no serious emergency unless we get into a shooting war in Berlin. But just as important is the Administration's little-known attitude that there will be no big profits from any national emergencies. It intends also to see that inflation does not get a head start.

The thinking in Washington is that restraint—or as economist Eliot Janeway calls it, "the coming austerity"—must be exercised; especially as we build up to calling Mr. Khrushchev's bluff—if it is a bluff.

Today's problem means that management must decide if its inventory is proper. Personnel needs must be met before there is a scramble for supervisors and middle management. In a time when there is a chance of controls, higher taxes, and higher costs, the average company needs men who can ride all three horses—and still stay right-side-up.

No one expects company officers to lose their heads and start large-scale hedge buying. By the same token, no board of directors will be pleased —nor will the stockholders—to see its company going into a tough defense period with meager stocks, loss statements, and a poorly mapped plan of action—and reaction.

What's ahead for management requires balanced judgment, decisiveness—and an awareness of deteriorating world conditions.

Tom Campbell

Editor-in-Chief

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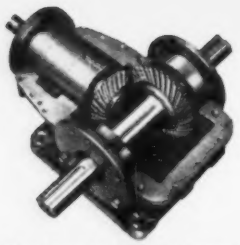

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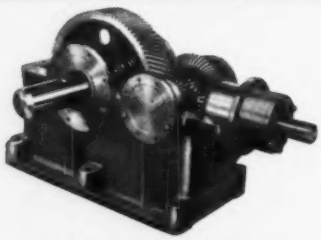

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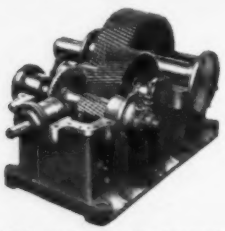

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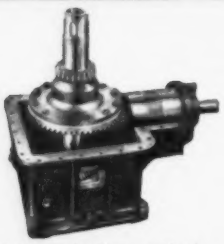

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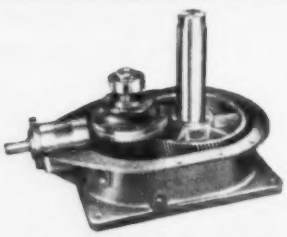

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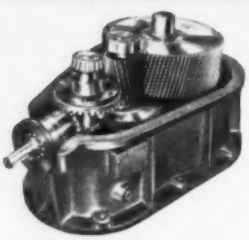

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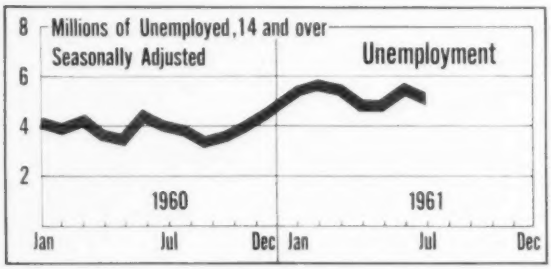
Job Picture Is Cloudy

Jobless rolls dropped by over 400,000 during the month ended July 15. But the jobless rate rose from 6.8 to 6.9 pct of the total workforce. Some 5.1 million are now unemployed.



A host of seasonal factors create the confusion in the job and jobless picture. Casual workers do much to tilt figures this time of the year.

A seasonal drop in employment of 100,000 was expected in manufacturing. But the drop was only 27,000. An employment pickup was scored in the steel industry. Machinery and fabricated metals held steady, instead of showing a moderate seasonal drop. And autos, as expected, showed a 20,000 drop.

Summed up, the employment picture is this: Holding its own through the summer letdown, with some bucking of seasonal forces that signal brighter days ahead.

Inflation Threat Is Weighed

More businesses are laying plans to face possible inflation. Three strong signs that prompt this:

Non-defense spending bills have gone beyond even what the Administration requested. The result will be a deficit, maybe as high as $10 to $14 billion.

Regular recovery forces are pushing up real and potential product demand.

New labor contracts will boost costs in several key industries.

Foreign Investment Soars

The race by U.S. industry to build plants inside the European Common Market has hit a stepped-up tempo. U.S. companies are increasing their foreign investments in plant and equipment by 20 pct this year over last year. Much of the $4.5 billion total is slated for Common Market countries. A still bigger rush to build is expected as Great Britain heads for membership.

The reasons are clear: Companies with plants in the Common Market avoid paying external tariffs. And they can shoot their products across tariff-free borders within the market group itself.

But as a top Commerce Dept. analyst told The IRON AGE, "Getting inside is not a ticket to success. The key is still marketing the right product. The market is enormous but very selective."

"Scare" Buying May Strike

The international crisis may well pull the trigger on consumer demand. So far, end product demand has been a weak link in the recovery. Normal recovery forces have failed to unleash pent-up buying power of the U.S. consumer.

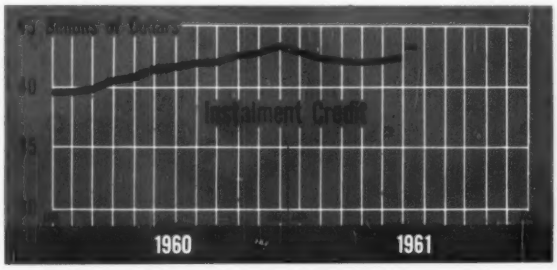
Example: Savings gains for the first six months this year hit a record-breaking $4.4 billion. Yet retail sales and housing moved only sluggishly with fractional gains.

Buyers have been sure they can get anything they want when they want it. And there has been no inflation threat to spur buying.

But any idea of military action implies rationing and shortages. If the international crisis worsens, watch the U.S. public invade auto dealer showrooms when the new models are unwrapped. They'll want new cars in their garages—just in case. This would spearhead a major buying trend.

Instalment Credit Expands

Sales of consumer durables depend in large measure on the willingness of buyers to take on time payments



to finance their purchases. The instalment credit picture in the month ending in mid-July should hearten makers of consumer durables. Credit extensions for the period were just under $4.1 billion, the highest since November.

Total instalment credit outstanding rose $100 million over the previous month to $42.4 billion. This allows for seasonal factors.

Why Alexander's Army was Battle-Hungry

Alexander-the-Great was the top military leader of all time for a good non-military reason. He perceived that an army "travels on its stomach" so he provided stainless steel mobile kitchens for the sake of good taste. His soldiers literally "fought to eat."

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WASHINGTON, PA.

UAW Officer Says: Resist Union Demands

Sometimes it pays to listen to the union.

Owners of stamping plants in the Toledo area have been told they should organize to resist UAW demands. It's either that or "die out" and along with them would go the jobs of their employees.

These weren't the words of a "union buster."

The advice came from United Auto Workers vice president Richard Gosser of Toledo. His suggestion was made at a closed meeting of union and management executives in Toledo and reported in "Labor Trends."

Mr. Gosser, known for thinking thoughts that would never get the Solidarity House seal of approval, had several other suggestions:

1. Auto industry contract terms shouldn't be forced on UAW-organized stamping shops because the stamping industry is in "dire economic straits."

2. Productivity hasn't gone up as much as it should in many of Toledo's press plants. If the companies don't improve, the UAW should step in to help.

Congressmen Propose Wage Hike Ceiling

Some Congressmen are asking a limit on wage increases. They say increases should be limited to 2 pct. At present, the average is 3 to 3.5 pct annually.

Rep. Fred Schwengel (R., Iowa) and Rep. John Ashbrook (R., Ohio) told the House that a smaller wage increase would stabilize prices. "If we want stable prices," they say, "wage increases on an average can be only a little more than half as large as they have been."

The Congressmen believe that a 2 pct standard for wage increases would bring about lower prices in industries where production gains are higher than average.

Labor Peace Reigns In First-Half '61

Number of workers idled and man-days lost due to strikes in the first half of 1961 were lowest for the period since the end of World War II, says the Dept. of Labor.

There were an estimated 1680 work stoppages in the period. These affected 621,000 workers, causing 6.72 million man-days of idleness.

For the first half of 1958, the next lowest period, 686,000 workers were idled with a loss of 7.12 million man-days.

Steel Employment Up Since First of Year

Steel industry employment jumped to 532,282 hourly and salaried employees in June. This is 13,641 more than May, and 54,739 higher than the low point reached in January. The post-strike high was 640,100 in February, 1960.

Payroll cost per hour worked by hourly workers, as reported by the American Iron and Steel Institute, was $3.48 during June, 1961. In May it was $3.467.

UAW: Time for an Offer

A Big Three automaker will have to put a definite offer on the line by next week in the industry's contract negotiations. The Aug. 31 deadline on present General Motors-Ford-Chrysler contracts is drawing close.

So far, only American Motors has made a solid offer. It includes profit sharing, but is tied to other proposals not too palatable for the United Auto Workers. It calls for dumping the cost-of-living clause.

Which company will make the Big Three offer is still a guess. So is the offer itself. But union sources indicate that it will be a decision arrived at jointly by the automakers. Reportedly, the companies have been comparing notes in secret strategy sessions.

The UAW has intensified strike talk since Aug. 1. Polls at local plants would indicate the rank-and-file won't hesitate to walk out.

And the union, which had said little about its strike fund, now claims it will reach $42 million by Sept. 1. In 1958 it was only $25 million. Larger strike benefits have been voted.

Meanwhile, the UAW has made a guessing game of which company it will hit if there is a strike. Most of the heat has been put on GM and Chrysler. But Ford is still a possible target. Key concessions have been gained from Ford in previous contracts.

One thing seems likely: The union will delay this key decision until just before the contract deadline.

Timing would put a crimp in 1962 model introductions. This year contracts end just as the industry will be building up new model production.

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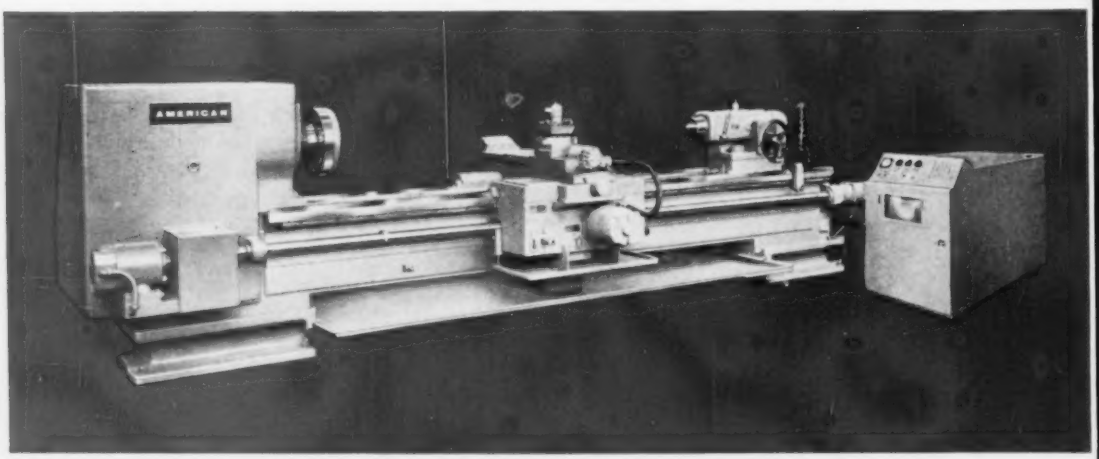

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★Scare Buying Controls Set

A sudden wave of inflation or scare buying may mean indirect government controls on business. They would come through higher interest rates and tighter restrictions on credit.

Price and wage controls hinge on the outbreak of limited war, or declaration of a national emergency. But indirect controls hinge only on a stronger demand for credit or a rapid inventory buildup.

Government agencies are now preparing plans for a crackdown on credit and inventories.

The Federal Reserve and the U. S. Treasury fear an inflation is on its way. They base their fears on sharp rises in the economy and the forthcoming impact of increased defense spending.

These Federal agencies see a tendency toward inflation, with its higher prices and weaker dollar, in the months ahead. They are afraid that if war talk over Berlin gets too strong, scare buying by businessmen and consumers will begin and, thus, raise demand artificially.

Action to halt scare buying and inflation would come in the form of credit control. The Federal Reserve Board is prepared to step in, as is the Treasury Dept. If President Kennedy agrees with this policy, inventory controls through the U. S. Commerce Dept. might also be enforced.

Federal Reserve would stop buying government securities on the open market and start selling the federal bonds to cut down bank reserves. It would also increase interest rates to banks. This would mean higher bank interest rates to borrowers.

Inventory controls could be imposed on defense contractors by the Commerce Dept. It has the power to order defense suppliers to hold inventories in line with "needs."

■ Defense Buildup Buying Is Gradual

Increased defense procurement funds will affect only companies already producing military goods. And the effects will not be felt for several months.

Federal metalworking analysts at the Commerce Dept. say "metalworking companies are not getting any real orders now. The new business that will result from these increases in defense spending won't show up for months yet."

Defense Dept. sources say the Pentagon plans to go to existing military suppliers for the new procurement.

Labor Dept. experts say the military buildup for the Berlin crisis will mean "a gradual increase" in manufacturing jobs in the next few months.

The total defense money bill amounts to $46.6 billion. Of this, $3.5 billion is for the present military buildup over Berlin. Of the $3.5 billion, $1.8 billion will go for new procurement.

■ Crisis Cuts U. S. Trade With Reds

The U. S. may tighten restrictions on trade with Russia and its satellites. The Kennedy Administration is considering a switch in policy which could lead to more strict controls on shipments of American goods to Iron Curtain countries.

Up until now, the Administration has sought more trade with the Soviet bloc. But the Berlin crisis has changed this.

Commerce Secretary Luther Hodges says though things are at a status quo now, restrictions on shipments to the Soviet bloc are "entirely possible."

Hodges and Secretary of State Dean Rusk stated jointly that the Administration has rejected a total embargo on trade with Russia for the time being. But they said the decision is subject to review as the Berlin crisis develops.

■ Industry Endorses World Trade

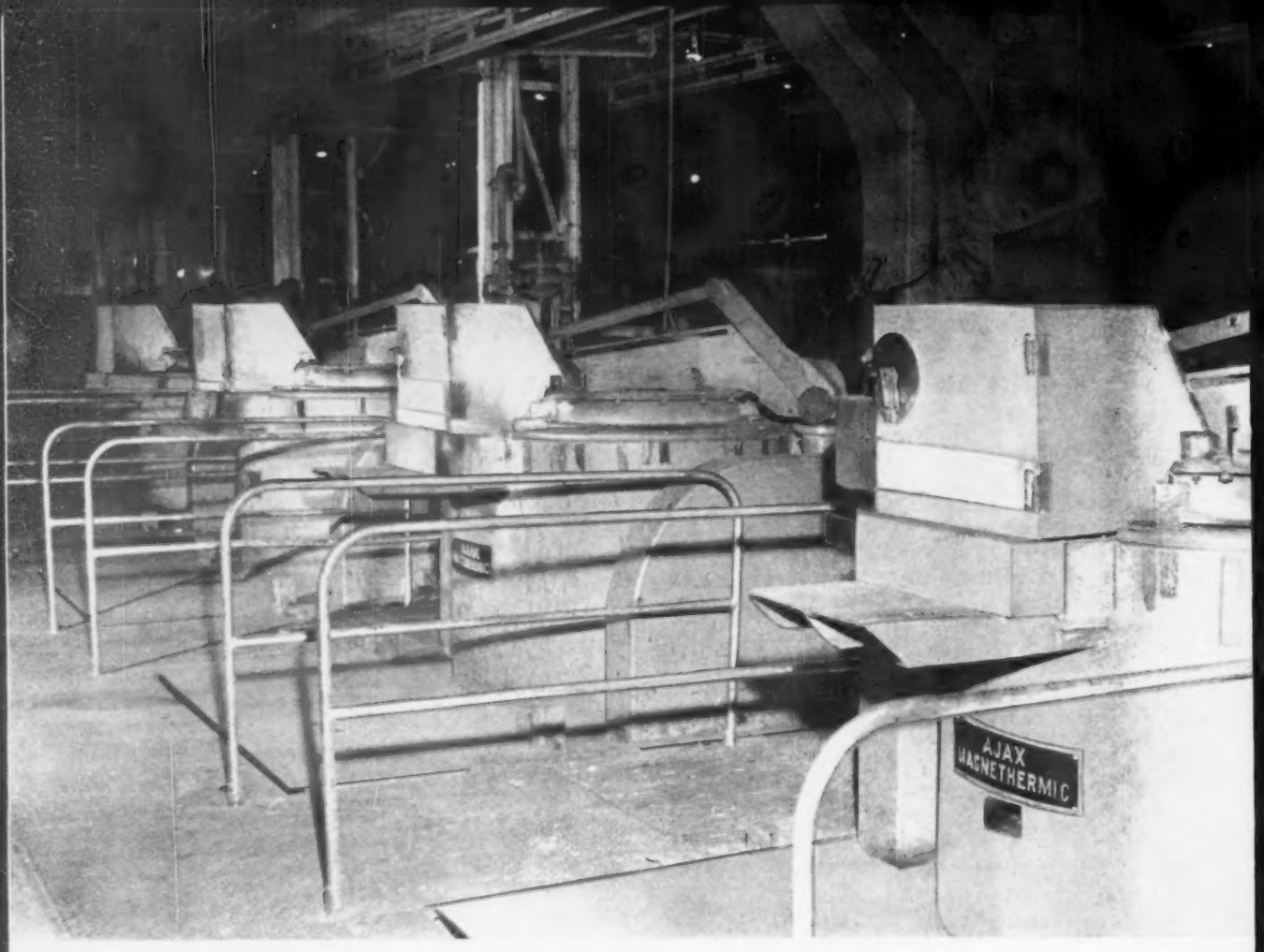
Metalworking executives told Congress this week that the way to aid U. S. employment in such industries as steel and aluminum is to increase exports.

This belief was made clear at hearings before Congressman John H. Dent's committee on the impacts of imports and exports on American employment.

It is the belief of both steel and aluminum company executives that the best solution to the import problem is emphasis on more use of the metals throughout the world and more sales overseas.

Some executives called for government assistance in this plan. They pointed out that reform of present depreciation laws would help promote economic growth.

R. Conrad Cooper, executive vice president of U. S. Steel, summed it up this way: "We must make our costs competitive. This will help us greatly in creating jobs by selling more overseas while at the same time competing effectively against imports.



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"Four Ajax units, each melting 2400 pounds per hour, replaced 14 gas-fired furnaces. The results have been astonishing. Working conditions have improved appreciably by reduction of foundry temperature and noise level. We have saved 30% in floor space, greatly reduced maintenance and practically eliminated down time.

"Equally important . . . service. Even though we are located on the West Coast, the Ajax Magnethermic service has been second to none."

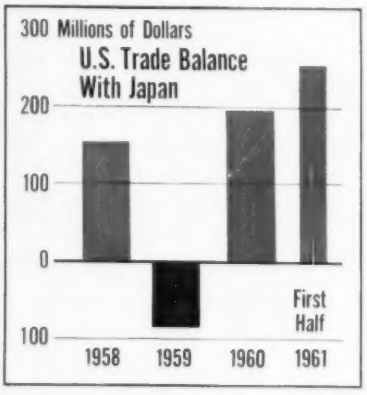
Gottlob Hinderer, Works Manager
Price Pfister Brass Mfg. Co.
Los Angeles, California

Manufacturer of plumbing faucets and gate valves

Japan Moves to Cut Payments Deficit

Japan apparently is making a quiet drive to cut back its balance of payments. It is already having some effects on U. S. metalworking and other exporters to the country's rising economy.

One step to cut back the payments deficit is to slow the country's rate of industrial expansion. In



another move, the official discount rate for commercial bills has been increased while the discount on export bills has been decreased.

Here's one way this drive is reflected in the U. S.:

A Japanese source tells The IRON AGE that the government there has asked the copper industry to hold down its buying, and to hold down prices paid, for copper scrap in the U. S.

This could also be a result of a talk between Japanese and U. S. officials urging this very point. (IA-July 13, '61, p. 126)

The urging apparently was done in an informal basis. Reason given was a revision of the trade program.

There is evidence the Japanese copper industry is cooperating. Dept. of Commerce preliminary statistics tend to bear this out, a source says. And custom smelters in the U. S. say they notice a definite easing of Japanese scrap buying. Japanese buyers are now aiming for "occasional lots" of No. 1 mill quality copper scrap. Japanese buying must still be considered active, however, in copper-alloy scrap.

In creating the unfavorable balance of trade with the U. S., the unusually heavy tonnages of copper scrap moving from the U. S. to Japan have been a major offender.

More Trouble For Venezuela

Troubled Venezuela is in for even more unrest—possibly an eventual political upheaval.

Venezuelan sources report that all political parties there are now turning to the left. Also, pro-Castro elements and outright Communists are growing in strength.

The fact that President Betancourt is pro-U. S. is no longer a guarantee that other leaders in his party share that feeling. In recent months, anti-U. S. sentiment has been developing at all levels in all parties.

General opinion is that chaos will prevail unless economic stability is established and the depression is erased. This state of affairs is not apparent to the casual observer, but insiders contend this is not an exaggeration of true conditions.

British Export More Machine Tools

British machine tool builders have shortened their delivery dates. As a result, they are winning more orders from abroad.

Figures of the Machine Tool Trades Assn. of Britain show that although value of all new orders received in May is down 6 pct from year-earlier totals, orders for export are up significantly.

Export orders reached $25.44 million in May, compared with $20.334 million in April and $15.680 million in May, 1960. The trend is attributed, at least in part, to the industry's relatively better position on deliveries. This is particularly important in relation to West Germany.

However, new orders for the home market in May were 21 pct under May of 1960. Monthly figures have tended to be erratic, but the trend this year has been generally downward.

U. S. Companies Expand Abroad

The pattern of overseas spending by U. S. industries for new plants and equipment is detailed in a new study by the Dept. of Commerce.

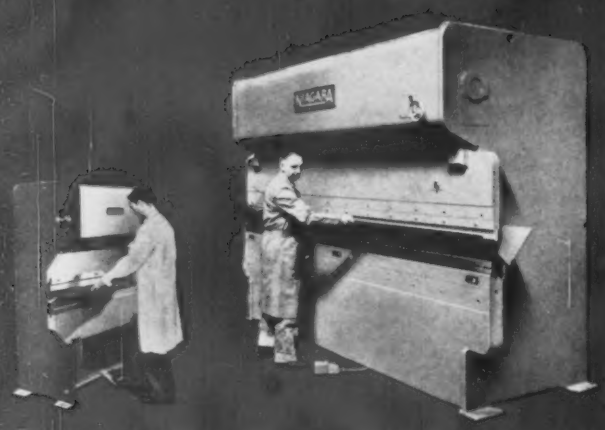
According to the survey, U. S. companies will spend $4.5 billion this year and expect to maintain this rate during 1962. The 1961 total is an increase of more than 20 pct in capital spending abroad from 1960.

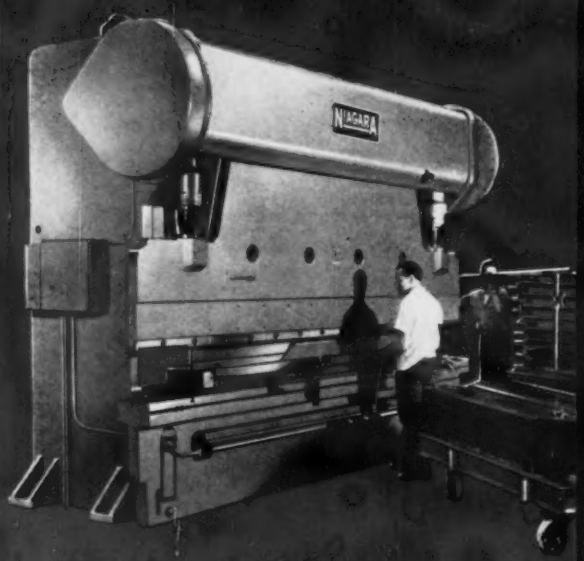
The high year was in 1957 when the petroleum industry was particularly active in foreign operations.

Where is the money going? Over half of the expenditures for 1961 are set for Europe. Canadian plants are being expanded or improved at a rate of nearly $400 million annually. Expenditures for manufacturing plants in Latin America will be increased 50 pct this year.

Who is spending the money? Automotive and related companies show the largest advance in investment abroad, up to $530 million this year and nearly 60 pct higher than in 1960. This rate will be maintained into 1962.

The machinery group is also increasing its investment in plant and equipment abroad. The 1961 rate of $321 million is a 40 pct increase.





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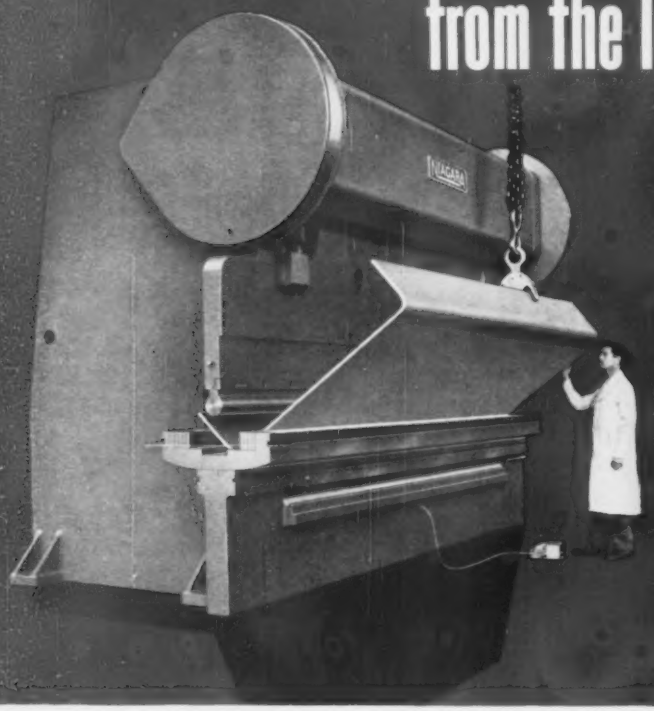

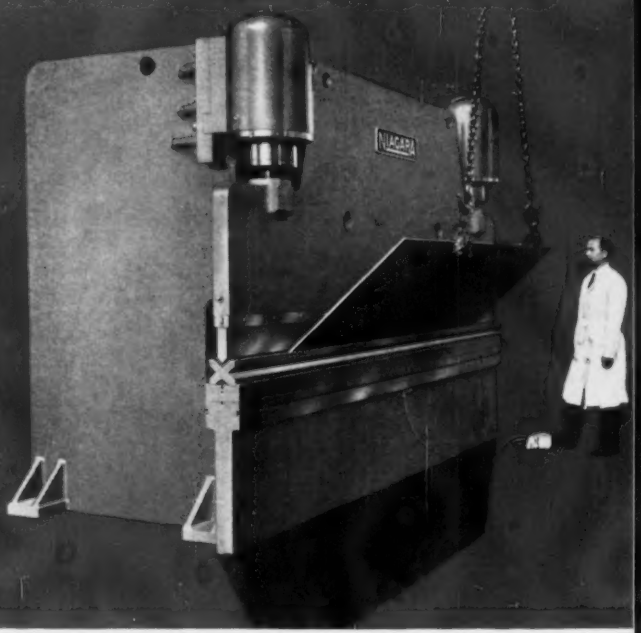

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More Tasks for Honeycomb

Industry consumes millions of pounds of honeycomb every year. Uses range from structural members to astronaut beds, and new ones keep cropping up. For example, honeycomb tooling cores are proving useful for products which get continuous face lifts. You can alter this versatile tooling in a hurry, without mushrooming expenses. It's also easy to maintain.

Bans Rust on Wet Steel

Want to stop rust without footing the bill for expensive surface preparation? Colloids may be the key. There's no chance for rust to form underneath collodial coatings. They prevent it by absorbing the rust particles. One new colloidal coating even adheres to wet steel. It's formed by a mass reaction between lead, sulphur and oleic acid. The reducing effect of the sulphur reaction also inhibits rust formation.

Metals Wear Whiskers

Whiskers are a nuisance to most men, but they're a promising development in metals. Blending tiny sapphire crystals into pure silver ups its strength five times. Although they can't take machining, these crystal whiskers have great strength. So do structural metals, but they lose most of it above 2000°F. Imbedded whiskers may let these metals hold their strength at higher heats.

Lubricate at 30,000 rpm

Three contenders came out on top in a recent study of gaseous-entrained lubricants. The winners? — Molybdenum disulphide in nitrogen, graphite plus cadmium oxide in air, and molybdenum disulphide plus metal-free phthalocyanine in nitrogen. They all suit high-speed bearings.

New Life for Cutting Tools

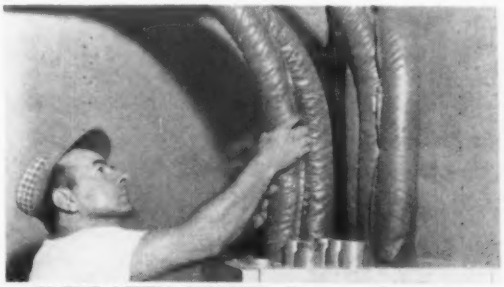
Use of a bonded dry-film lubricant stretches cutting-tool life by preventing metal pickup. Alpha Molykote's latest film applies to any clean metal surface. Other than cleaning, there's no surface preparation. After easy spraying with a thin coat, tools dry in air for 30 minutes. Then the coating cures for 1 hour in an oven heated to 140°F. Parts are ready for use after cooling.

Cuts Coke Consumption

Belgian steelmakers are taking a close look at fuel-oil injection. They're considering it for the 18-ft diam hearth of a blast furnace soon to be built. It's believed injection will lower coke consumption, ease burden descent and step up iron output. Experimental work backs up this viewpoint. However, to get top results, furnace temperatures must be boosted about 150°-200°F.

Pliant Ducts Carry Icy Air

Flexible aluminum ducts, part of a new air-conditioning system, promise low-cost cooling without bulky ductwork. Covered with fiberglass and neoprene, the flexible duct winds its way through stud spaces much the same as electric cable. Because of heavy insulation, you can forget about condensation. This lets the system take advantage of a deep refrigeration coil. As a result, cold air temperatures tumble to 40°F.



INSULATED DUCTS: Ban condensation.

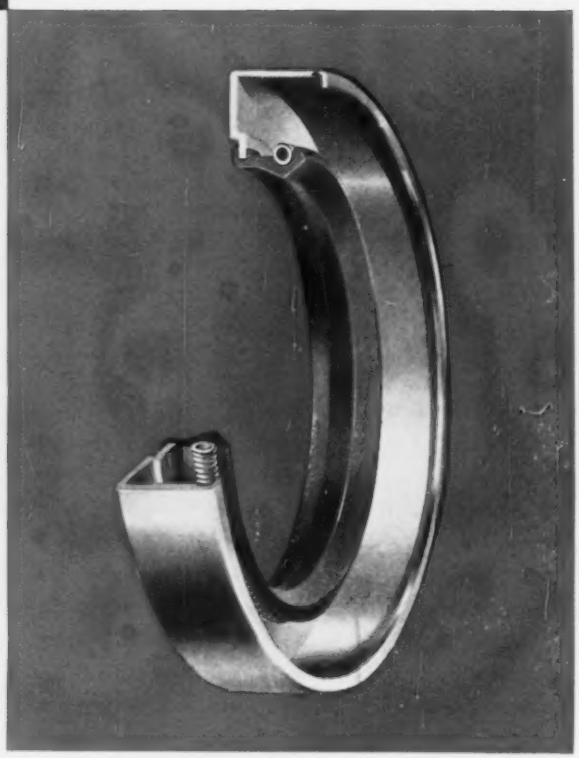
Model T Rides Again?

A recent Army contract calls for study of a rubber-tracked vehicle that can traverse hard surfaces, water, snow, mud or tundra. Old timers may claim a Model T could have filled the bill quite handily. But the PAT (plenum air track) cargo or personnel carrier is a horse of another color. Chance Vought plans to build a half-scale model. It will ride on a continuous track of rubber cells filled with low-pressure air. PAT'S payload to weight ratio should approximate 1:1.

C/R®

DESIGN NOTES

C/R offers new bonded CRS Seal design in standard sizes — without premium tooling charges



Design Advantages

The CRS Seal now provides a new level of C/R Seal performance through its simple, bonded design. There are no internal parts to misalign, no avenues for internal leakage. The shell and sealing member are integral — bonded securely for the long life of the seal. The CRS Seal incorporates a sealing member with both improved lip configuration and improved concentricity. The sealing member has been strengthened over former designs by placing more material at points of major flex and wear — and without increased shaft loading.

Designer Advantages

The CRS Seal gives the designer one, basic, rugged shaft seal design which may be applied with high reliability to the great majority of common shaft seal applications — particularly in industrial, automotive, farm, and off-the-road equipment.

Four basic design variations are available. As you can see, these provide an auxiliary sealing lip, where it may be required, or provide extra rugged shell construction where conditions suggest the need to protect the seal lip against assembly damage — or where large, heavy-duty shafts are being sealed.

Selection of the new C/R Type CRS Seal gives the designer and buyer major advantages over special seals: shorter lead time on orders, simpler specification, savings in time and money, and improved assembly quality and reliability.

Operating Maximums*

Shaft Speeds	3600 fpm (single lip) 2500 fpm (double lip)
Run-out	.015" TIR dynamic eccentricity .010" static eccentricity
Temperature	−30 to +275°F. (225°F. in EP lube)
Pressure	5 psi (single lip) 10 psi (double lip)
Media	Oil, grease, fuel, water

Not all conditions present in one application

New, Improved Compound

Standard sealing members for the C/R Type CRS Seal are molded of a new Sirvene synthetic rubber compound having markedly superior sealing and wearing properties. It is a Buna-N-based material with low-friction characteristics. The CRS Seal can also be furnished in the usual special materials such as acrylates, Silicones, and butyls. Shells are of standard steel, but can be provided in corrosion-resistant materials on special order.

Consult C/R Engineers

For assistance on the application of the new CRS — or on any oil seal problem, get in touch with C/R Oil Seal Engineers. They're specialists in fluid sealing — and will gladly cooperate with you.

For More Design Data:

You will want the complete design data on the new CRS Seal. Write for our Bulletin CRS-100. It gives you the complete list of standard sizes, widths, O.D.'s, shell thicknesses and sealing lip heights. You will want it to compare and then specify C/R's CRS Seal.

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Export Sales: Geon International Corp., Great Neck, New York

ASTM A-36 steel plate was used in rebuilding this payloader bucket for White Oak Excavator Co., Plainville, Conn. The Bethlehem steel plate, supplied by a prominent Steel Service Center, was selected for its strength and weldability.

ASTM A36 A242 A440 A441

Here's why these ASTM grades can cut your steel plate costs

It makes a lot of sense to order Bethlehem steel plates by ASTM Specification number, especially if you need specific mechanical requirements:

1. *You get a superior steel*—ASTM grades were developed by representative consumers and all plate producers working together to arrive at the best procedures for making these steels meet definite requirements.

2. *You can save money*—All four ASTM steels, summarized on the next page, have increased strength and three have increased corrosion-resistance. These advantages often permit cutting down on thickness, at no sacrifice of strength. Thinner sections can add up to a real saving in steel costs.

Steel

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BETHLEHEM STEEL

	YIELD POINT MIN. (X1000)		
	To ¾ in. Inc.	Over ¾ in. To 1½ in. Incl.	Over 1½ in. To 4 in. Incl.
ASTM A36—First Issued 1960 This specification is designed to produce increased strength with control of weldability by carbon and manganese requirements as necessary.	36	36	36
ASTM A440—First Issued 1959 **BETHLEHEM MEDIUM MANGANESE** This specification was issued to define the requirements for a higher yield-point grade for riveted or bolted structures or with controlled welding conditions.	50	46	42
ASTM A441—First Issued 1960 **BETHLEHEM MANGANESE VANADIUM** This specification, for welded structures, offers high yield-point, excellent weldability, and can give improved impact properties at moderate cost.	50	46	42
ASTM A242—First Issued 1941 **BETHLEHEM MAYARI-R** This specification was designed for welded structures where atmospheric corrosion resistance is important, and requires alloying elements to achieve the increased atmospheric corrosion resistance.	50	46	42

The increased mechanical properties of the four grades of steel plates in this chart often permit a reduction in plate thickness, cutting steel costs. These grades are all readily available from Bethlehem.

STANDARD OR SPECIAL PLATE REQUIREMENTS . . .

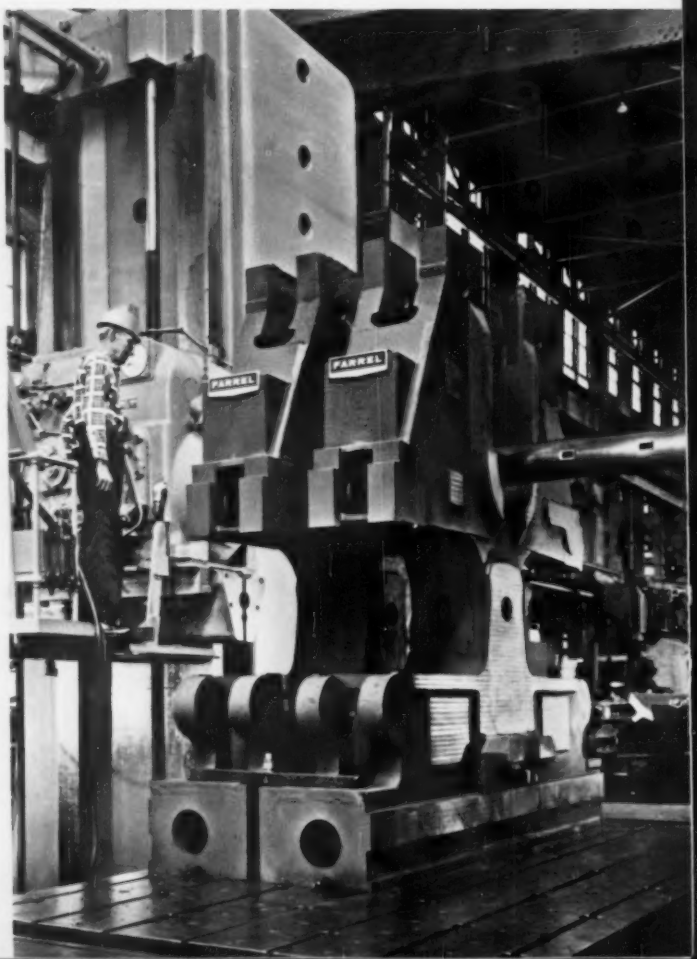
Here's how Bethlehem can help you

Here's how you can be sure your steel plate will do the job: just get in touch with us.

1. Let a Bethlehem metallurgist visit your plant and go over your problems with you. He can discuss not only all grades of steel plate, but the new ASTM Specifications too.

2. Let Bethlehem tailor-make plates to your particular requirement.

3. *A helpful hint for Steel Service Centers:* We'd like to help you stock steel plates that are right for *all* your customers. Let us recommend grades for your stock so you may economically supply plates for the many different needs of your customers.



Bethlehem carbon steel plates are used in the housings and bedplates of sugar mills produced by Farrel-Birmingham Company, Inc., Ansonia, Connecticut.

Steel

for Strength . . . Economy Versatility

Here's why plate users like to buy Bethlehem

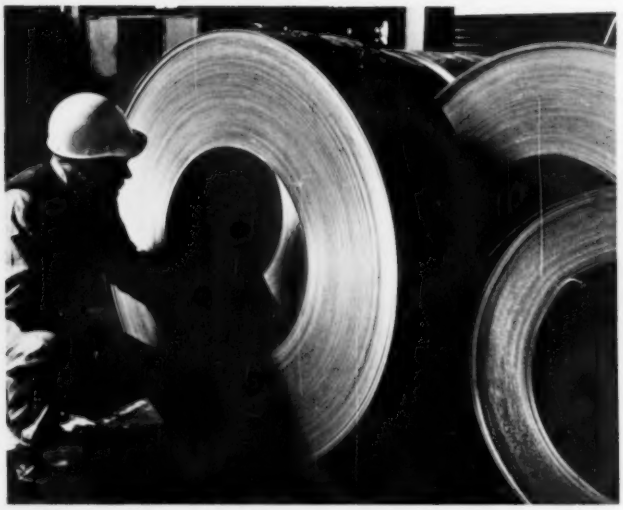
Bethlehem delivery dates are reliable.

Bethlehem sales offices in 40 cities are completely informed on plate deliveries for their customers. If you have any unusual delivery problems, you'll find our sales office people able to give you fast answers.

Nobody can beat the quality of Bethlehem plates. Our plate-producing facilities are modern. Quality control at every step and thorough inspection assures consistent top-quality.

Our metallurgical people are always ready to discuss any problem with you. Often they're able to make recommendations for an improved product, as part of Bethlehem's service to customers.

Bethlehem steel plates as thick as 3¾ in. are used in this machine, called the Bag-O-Matic, for curing rubber tires, built by the McNeil Machine and Engineering Co., Akron, Ohio.



Coils of steel plate are ideal for a continuous forming or stamping operation.

New! Plates in Coils

Bethlehem now furnishes steel plate in coils. To eliminate separate feeding, as in a continuous stamping or forming operation, these coils make possible real savings.

Any Bethlehem sales office will gladly furnish full information on plate coils, such as width, coil length, tolerances, slit edge, and pickling.

BETHLEHEM STEEL

BETHLEHEM STEEL

Bethlehem makes a wide variety of flanged and dished products, including ASME code, elliptical, standard, flanged only, dished only, shallow and double dished, and others. Many sizes of heads are stocked for fast delivery from Sparrows Point. Let us send you our stock list.

One of the most modern plate mills in the country is the two-stand, 160 in. plate mill at our Sparrows Point, Md., plant. Bethlehem supplies a full range of sheared- and universal-mill steel plates from .180 in. to 14 in. in thickness, in widths up to 150 in.

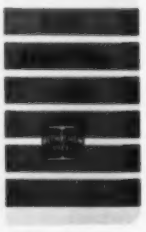
Do You have These Bethlehem Publications?

466—Steel plates—design information, tables, diagrams and metallurgical data.

S-58—Useful information on structural shapes for the designer. 80 pages.

415E—The fundamentals of alloy steels, including AISI classifications.

569—Specifications of 6 ASTM grades for construction (shapes, plates, bars).



420B—Analyses and grades of carbon, alloy, tool, stainless steels.

662—Description of highly specialized production of aircraft drop forgings.

513—Recommendations of tool steel grades for a variety of applications.

734—Description and properties of Bethnamel enameling sheet.

368B—Detailed information on wire rope, slings, and fittings.

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BETHLEHEM STEEL

Business Serves

Sir—I was glad to read the very fine article entitled "Vectors Define Casting Flaws" which appeared in the June 29, 1961, issue.

In these days of suspicion that large businesses are trying to control everything, I thought you might like to learn that this is far from the truth. As an example, we can cite the case of the development by General Electric Co. personnel of the techniques which made possible the operation and savings described in the article.

When one thinks of all these separate savings, they must add up to a tremendous total annually and over the years. There are many other examples where business and industries have made noteworthy contributions to the public advantage without cost to it. These seem to go unnoticed or unmentioned.

Business can and has made valuable contributions to society without being made or paid to do it.—Vernon Wiegand, General Electric Co., Cincinnati.

Failures Foiled

Sir—Under the heading "How to Avoid Bearing Failures" (IA-July 20, '61, p. 89), we found a very interesting and extremely well-illustrated group of facts so often overlooked.

We will appreciate 10 copies of this reprint so we may have one for each of our salesmen.—F. B. Green, Hamsley Inc., Brooklyn.

Purchasing

Sir—Thanks for your fine reporting of our recent interview (IA-Aug. 3, '61, p. 96). You certainly did a fine job and we already have had some complimentary comments.

Would it be possible to secure several additional reprints and may I send the information to our local association publications?—G. W. Howard Ahl, executive secretary-treasurer, National Assn. of Purchasing Agents.

■ **You may and reprints are on the way.—Ed.**

Patriotism Debated

■ **In the July 27 issue, reader Bruno Plab referred to editorial criticism of President Kennedy as "not very patriotic."**

Sir—I would like to reply to Mr. Plab's letter. If he confuses blind allegiance to the office of the President with patriotism, he justly deserves the political system which can develop if two-thirds or three-fourths of the electorate agree.

Our country can achieve its greatest strength, moral as well as physical, only when patriotism and loyalty are rationally arrived at on an individual basis, collectivistic-idealists notwithstanding.—G. R. Reed, R-N Corp., New York.

Materials Preview

Sir—Congratulations on "Materials of the Future" (June 22). It is one of the best articles on metallurgy this year.—Dr. Juan B. DeNardo, Buenos Aires, Argentina.

"You're giving us too much spring for our money."

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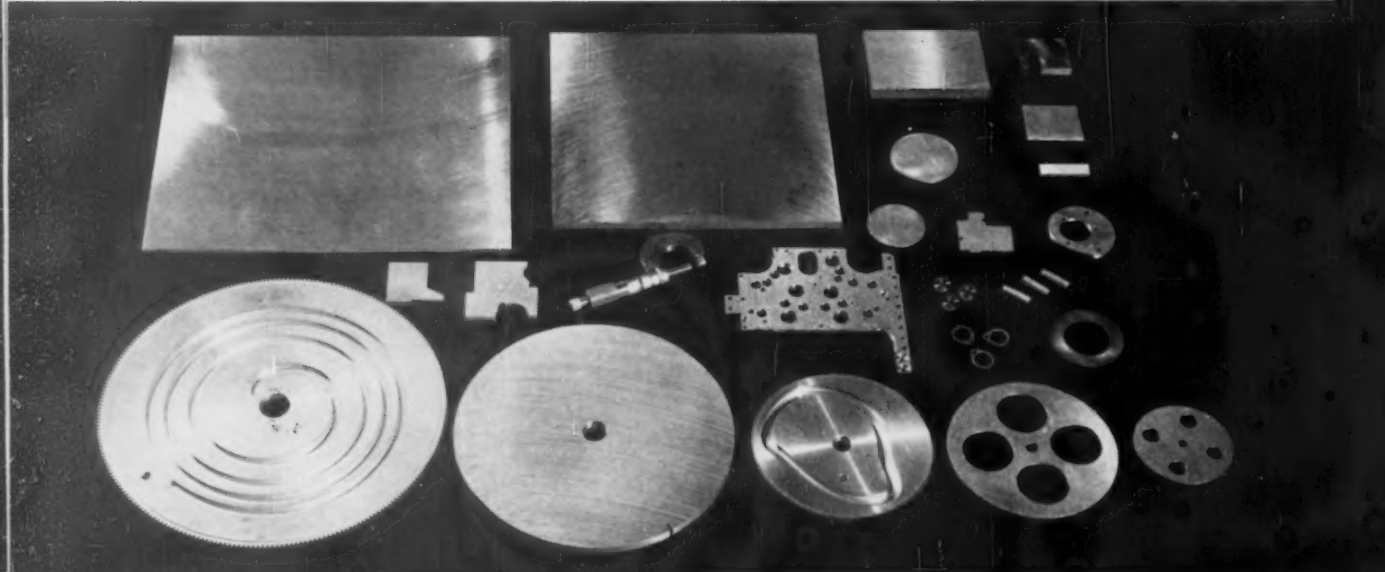
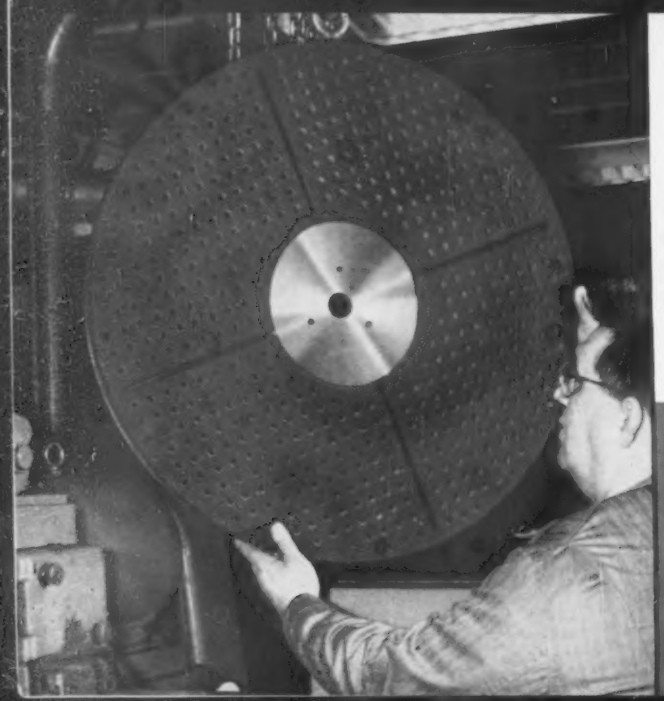




Gardner abrasive specialist developed this disc specification to grind all parts, eliminating down time for disc changing. Photos courtesy of Ford Instrument Co., Div. of Sperry Rand Corp.

GARDNER

GARDNER MACHINE COMPANY, BELOIT, WISCONSIN

subsidiary of Landis Tool Company

Buyer's Storehouse

Readers of our special pages (those on Washington, labor, the auto industry, etc.) know we try to make them as meaningful as possible.

That goes for our weekly Purchasing page as well. Lately the Purchasing page seems better than ever. It's found each week in our Markets and Prices section.

Wide Variety—Checking back through recent articles we found an impressive group of subjects covered. In the area of purchasing management, there have been columns on negotiated buying, internal auditing, cost control, value analysis, and sales forecasting.

Other articles have gone specifically into problems every P. A. faces—distributor relationships, whether to buy overseas, how to purchase technical components, and sale of a company's scrap.

In addition, the page has continued to feature articles analyzing the buying outlook in specific markets—industrial diamonds, castings, motors, electronic equipment, to name a few.

For Anyone Who Buys—All in all, the purchasing page covers a lot of valuable ground, for the benefit of P. A.'s and others interested in buying.

There has to be a reason why the P. A. page is so well received. We believe it's the editorial skill of those who write and edit it.

Who's Responsible?—Many of the recent articles are the work of Associate Editor John Baxter. A skilled industrial editor, John has an additional quality that helps him write about purchasing—he's a former P. A. himself. During seven years as a purchaser, he served as buyer for a nonferrous metals fabricator and a pottery company.

The job of putting the page together each week in Philadelphia is handled by Associate Editor Brian Surer.

Regional Contributors—Material also comes in from our IRON AGE bureaus in leading metalworking centers. It's supplied by Regional Editors K. W. Bennett, Chicago; T. M. Rohan, Cleveland; G. J. McManus, Pittsburgh; A. E. Fleming, Detroit; F. J. Starin, New York; and G. A. Mulligan, also of the home office.

This week's article (which appears on p. 146) analyzes the buying of electroplating equipment. Another article soon to appear will preview some important new work being done on evaluating vendors. Watch for it.

"Well, Fats, it looks like . . . Yes! You've been named Manager of Purchases, Mr. Frimly!"

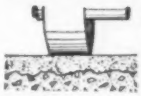
Vicious Circle

Cost control can be costly but it's worth it. This seems to be the thinking of one of the country's largest corporations. An IRON AGE district office received a call recently from an out-of-state operator. She wanted to know who from this corporation had called IRON AGE three or four months ago. As a starter, she asked the names of people we knew at the corporation. We gave her a few names, wondering how many more long distance calls would be made to establish the blame for other long distance calls.

RESURFACED FLOORS IN PERFECT CONDITION AFTER 8 YEARS!

Permaflex solved the resurfacing problem for the Caterpillar Tractor Co., East Peoria, Illinois. Photo above shows no rutting, scaling or cracking despite great weight flooring has had to withstand over the years.

Will not RUT under 3000 PSI



Attesting to the indestructibility of hard mastic PERMAFLEX are thousands of industrial plants, freight yards, truck terminals, railroad stations, warehouses, and shipping piers all over the U.S. Since 1918, over 100,000,000 sq. ft. of floor has been resurfaced with Permaflex. Permaflex is the original mastic . . . the only mastic capable of heavy duty! It bonds perfectly . . . never comes loose! Practically maintenance free! Permaflex is installed over old or new concrete, wood, brick or stone floors, walks or drives. Interior or exterior. A demonstration will convince you not to accept any substitute mastic (see test offer below). For if it isn't Permaflex . . . it isn't permanent!

NO DOWNTIME!

No need to move machines and stop production when you resurface with Permaflex. Floors are finished to a feather edge right up to equipment. Eliminates chipping problem! Smooth Permaflex floors are ready for foot traffic in 6 to 8 hours, heavy trucking in 24 hours, depending on drying conditions. Cost is amazingly low.

FREE LITERATURE FREE TEST OFFER

Write for 100 sq. ft. trial offer. Also free literature.

PERMAFLEX PRODUCTS COMPANY
1846 NORTH FRONT STREET, PHILA. 22, PA.
Specialists in industry flooring for over 35 years

New bulk-packaging of Ansco Industrial X-ray Film Saves storage space . . . Makes film handling surer, easier . . . Fits standard storage bins . . . Cuts film costs!

Two forms of the new Superpak package are available to Ansco Industrial X-ray film users. Illustrated here in the popular 3½ x 17 inch size. Both the Superpak '300' and Superpak '600' shipping cartons have the same outside dimensions. In the '300' package, each of the four inner cartons contains 75 sheets of film packed *with interleaving paper*. In the '600' package, each inner carton contains *twice* as much film—150 sheets—packed *without* interleaving paper.

Both packages bring the dependable performance of Ansco Industrial X-ray films to the industrial user in a more convenient and economical form. Ansco, Binghamton, N. Y.

Ansco

X-ray

COMING EXHIBITS

National Chemical Show—Sept. 5-8, International Amphitheatre, Chicago. (Chicago Section, American Chemical Society, 86 E. Randolph St., Chicago 1.)

Industrial Building Exposition—Sept. 25-28, New York Coliseum.

Detroit Metal Show—October 23-27, Cobo Hall, American Society for Metals.

Fleet Maintenance Exposition—Oct. 23-26, New York Coliseum.

Marine Supplies & Equipment Show—Nov. 15-17, Hotel Roosevelt, New York City.

MEETINGS

AUGUST

American Institute of Electrical Engineers — Pacific general meeting, August 23-25, Hotel Utah, Salt Lake City, Utah.

American Society of Mechanical Engineers — West Coast Conference, August 28-30, University of Washington, Seattle, Washington.

Metallurgical Society of AIME—Semiconductors conference, Aug. 30 - Sept. 1, Ambassador Hotel, Los Angeles. Society headquarters, 29 W. 39th St., New York.

SEPTEMBER

Air Moving and Conditioning Assn., Inc.—Annual meeting, Sept. 10-14, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, Guardian Bldg., Detroit.

International Industrial Conference—Sept. 11-15, Masonic Memorial Auditorium, San Francisco.

Society of Plastic Engineers, Inc.—Regional Technical Conference, Sept. 12, Central Indiana Section, Severin Hotel, Indianapolis.

(Continued on P. 27)

"Call FOSTER for pipe PLUS"

When you order pipe from Foster you get several big "pluses" in service and savings.

First, Foster warehouses always stock the exact pipe you want, in any quantities—lengths or carloads.

Second, you get big savings as a result of lowest possible material costs through single-source buying, combination shipments, and lower freight rates from Foster's strategically located warehouses.

Third, delivery is always "Faster From Foster."

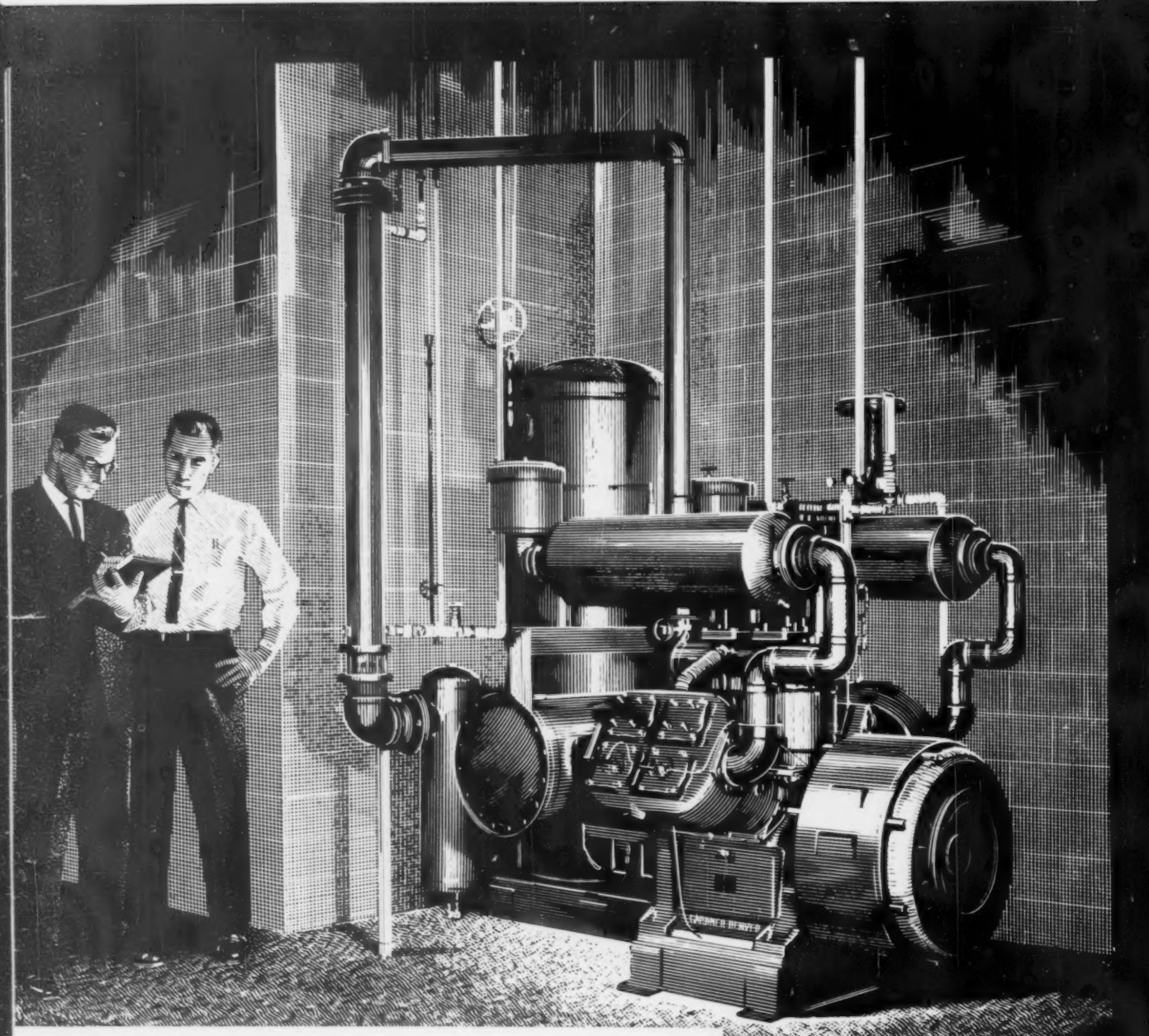
Foster's nationwide warehouses carry complete stocks of every standard item of Tested Pressure Pipe 1/8" thru 42", including hard-to-get Large OD's, Heavy Walls, and Seamless Carbon Pressure Pipe. We can also supply a complete range of Valves, Fittings and Flanges.

And for unusual savings, check Foster Structural Pipe 1/2" thru 60". It's ideal for hundreds of non-pressure uses, foundation piling and limited service lines.

Write **L. B. FOSTER CO.** for Pipe Data Chart IA-8.
Pittsburgh 30, New York 7, Chicago 4, Houston 2,
Los Angeles 5, Atlanta 8, Cleveland 35.

Faster From Foster

Pipe • Valves • Fittings • Piling • Track Material



"We pocket the difference"

The difference? Saving in floor space. No foundation cost. Quick and easy installation. The Gardner-Denver packaged air compressor goes right to work . . . provides a dependable supply of air for years. Want details? Request Bulletin WB-10.

Gardner-Denver Company, Quincy, Ill.—Offices in principal U.S., Canadian and Mexican cities. In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario.

International: Gardner-Denver International Division, 233 Broadway, New York 7, N. Y. Offices: Buenos Aires, Argentina; Artarmon, N.S.W., Australia; Brussels, Belgium; Rio de Janeiro, Brazil; Santiago, Chile; Barranquilla, Colombia; Lima, Peru; Ndola, N. Rhodesia; Salisbury, S. Rhodesia; Johannesburg, Transvaal.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

MEETINGS

(Continued from P. 25)

Non-Ferrous Founders Society—Annual meeting, Sept. 17-21, Shawnee Inn, Shawnee-on-the-Delaware, Pa. Society headquarters, University Bldg., 1604 Chicago Ave., Evanston, Ill.

AEC Welding Forum — Annual meeting (classified), Sept. 20-22, Southwest Research Institute. Institute headquarters, Granada Hotel, San Antonio, Texas.

Industrial Electronics Symposium —Sept. 21-22, Bradford Hotel, Boston. Institute headquarters, 51 East 42nd Street, New York 17.

Pressed Metal Institute — Annual meeting, Sept. 24-28, The Grand Hotel, Point Clear, Ala. Institute headquarters, 3673 Lee Rd., Cleveland.

American Welding Society — Fall meeting, Sept. 25-28, Adolphus Hotel, Dallas, Texas. Society headquarters, 33 W. 29th St., New York.

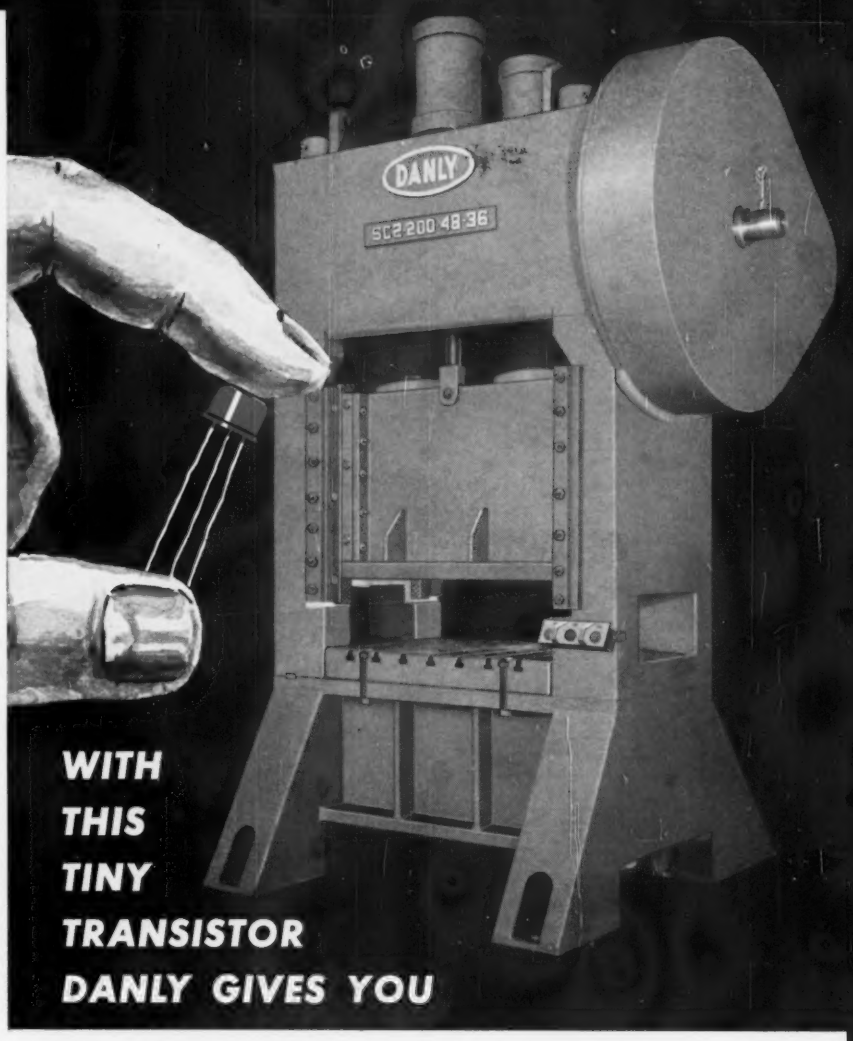
Assn. of Iron and Steel Engineers —Annual convention, Sept. 25-28, Penn-Sheraton Hotel, Pittsburgh. Assn. headquarters, 1010 Empire Bldg., Pittsburgh.

Steel Founders' Society of America —Annual Meeting, September 25-26, The Homestead, Hot Springs, Virginia.

American Die Casting Institute Inc. and The Die Casting Research Foundation—Annual meeting, Sept. 27-28, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.

American Production and Inventory Control Society — Annual national conference and technical exhibit, Sept. 28-29, Pick-Congress Hotel, Chicago. Society headquarters, 330 S. Wells St., Chicago 6.

Purchasing Agents Assn. — 14th Pacific Inter-Mountain Conference, Sept. 29-30, Westward Ho Hotel, Phoenix, Arizona.



AUTOMATIC SLIDE POSITION TO ± .005!

The operator sets a dial for proper shutheight. **Danly's Positioning Control** automatically adjusts the slide within .005" of the precise height desired! And with repeatable accuracy of ±.002!

This transistorized time-saver is typical of Danly developments in electronic controls . . . imaginative engineering to further improve the performance of any Danly Press. Other Danly controls include: **Danly Speed Control** for constant speed with varying loads; **Danly Proximity Control** to provide accurate switching without physical contact; **Danly Load Indicator** for direct readings of load; **Danly Motion Detector** to monitor speed of shaft, slide or table.

DANLY®

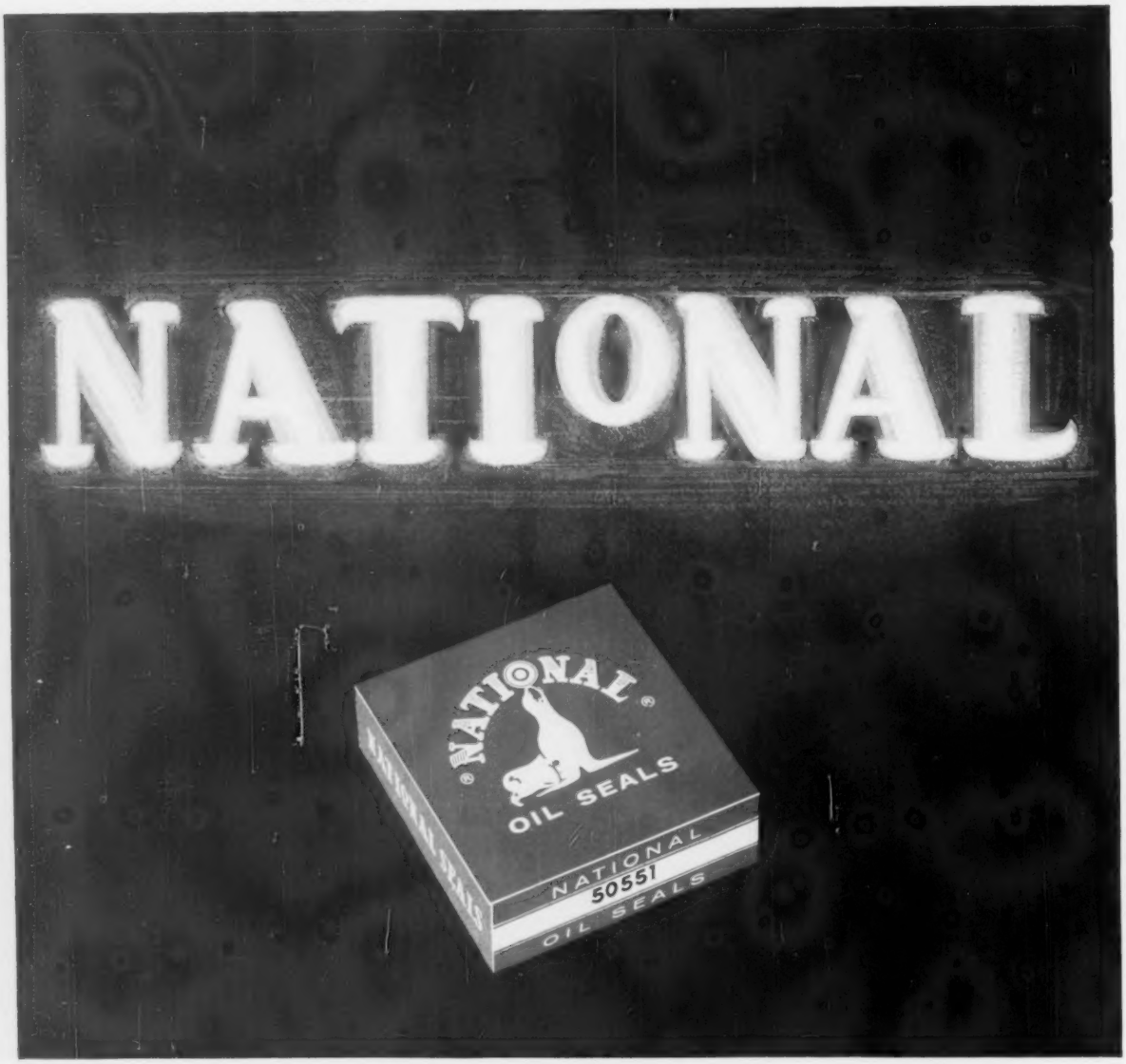
CONDENSED PRESS CATALOG and new control bulletins give you a package full of reasons why you should invest in a Danly. Write for your package today.

Mechanical Presses, Die Sets, Diemakers' Supplies, Hydraulic Metalworking Equipment

DANLY

DANLY MACHINE SPECIALTIES, INC., 2100 South Laramie Ave., Chicago 50, Ill.

Better products, *faster*, from your National Seal distributor:



A name like National doesn't just happen

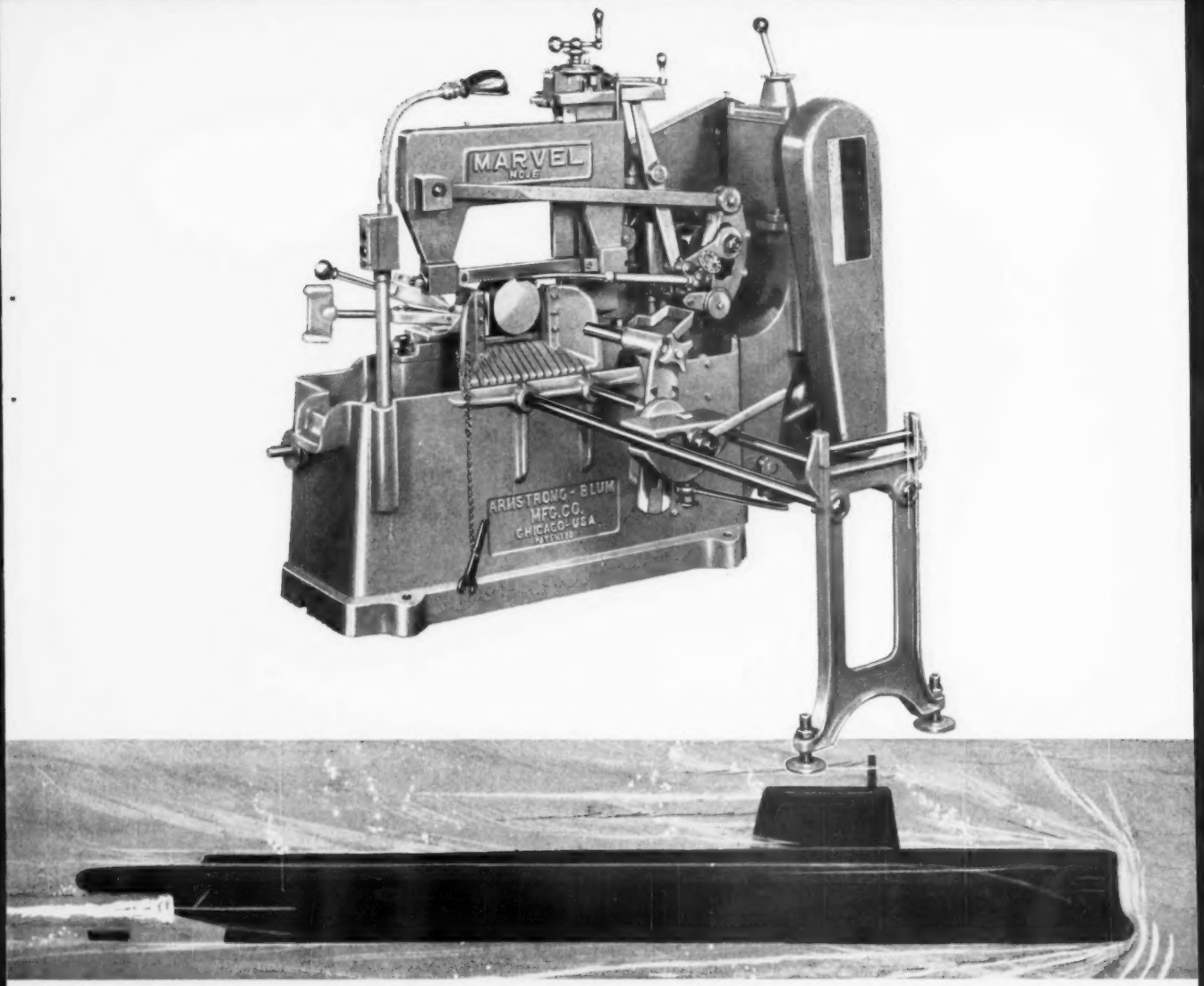
Years of experience and progress in engineering, designing and testing have developed a superior product to make National *the* name in oil seals. What does this mean to you? You get prompt delivery on National Seals from stock or special order, whenever you need them. A National Seal specialist will help you set up a working service stock so new seals will always be available to replace used seals. And your National Seal specialist will keep your inventory balanced for greater efficiency.

Insure uninterrupted protection for all your bearings. Ask your Bearing Specialist to recommend the proper seal for your needs. Call him today.

NATIONAL OIL SEALS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN



OBSOLETE ?

Emphatically no—not when a Marvel Hack Saw like this one can cut 4600 blanks of 3¼" round 303 stainless steel for just 1½ cents blade cost per cut—not when these 4600 blanks were cut-off at the rate of 20 pieces per hour, floor to floor! And this is typical production performance at that.

Obsolete? This Marvel Hack Saw Machine is as modern in performance as the next atomic powered submarine that will slide down the ways!

If you want faster cutting, the Marvel Hack Saw has speed to spare; accuracy of cut is assured by the rugged construction of the machine itself; blade cost, in many cases is less than 1¢ per cut.

When you consider these advantages and their low initial cost, Marvel No. 6 and No. 9 Series High Speed Heavy Duty Ball Bearing Hack Saws, as we build them, are your best cutting-off equipment buy today.

We can prove our point by demonstrating Marvel Sawing efficiency on your own work, without any obligation on your part. Because we have consistently built both Hack Saws and Band Saws for more than 40 years, we will give you an unbiased recommendation.

Catalog C-60 illustrates and describes the complete line of Marvel Sawing Machines. Write for your copy.

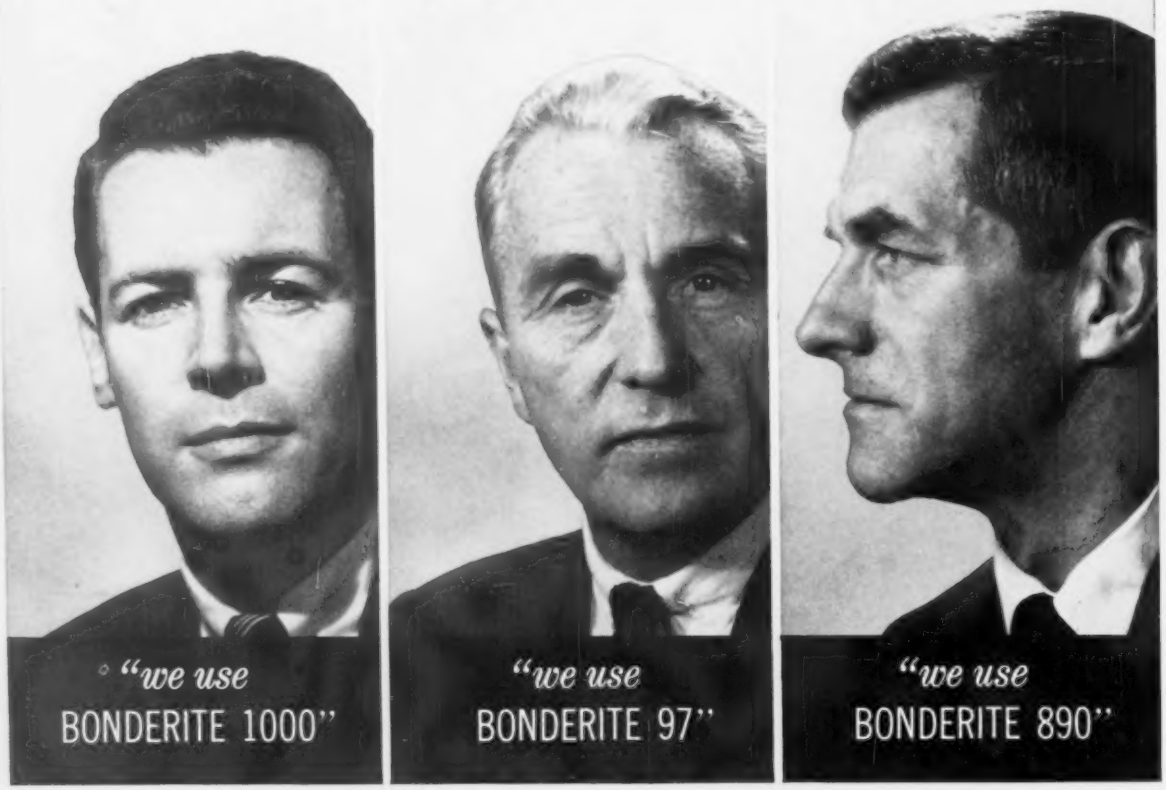
MARVEL *Metal Cutting* **SAWS**

BETTER MACHINES
BETTER BLADES

ARMSTRONG-BLUM MANUFACTURING CO. • 5700 Bloomingdale Avenue • Chicago 39, Illinois

S-1317

Three manufacturers with similar products–



There are 57 different Bonderites for metal

one of them is the right paint base for you

Parker long ago realized that any "universal" phosphating treatment would at best be a compromise. A "universal" treatment can't possibly meet the individual conditions and requirements in any one plant as exactly as can a Bonderite that is formulated with that plant's finish line needs in mind.

Parker has many phosphating treatments (38 of them for steel alone), has trained its representatives to match the right Bonderite to a customer's total requirements, and invests hundreds of thousands of dollars in research and development to keep ahead of the ever-changing finishing demands of modern industry.

Don't compromise on quality with a "universal" treatment when Parker can prescribe a *Bonderite* that's right for *you.*

PROTECTED BY Bonderite PARKER RUST PROOF CO. QUALITY CORROSION RESISTANT

Parker Rust Proof Company
2197 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE corrosion resistant paint base • BONDERITE and BONDERLUBE aids in cold forming of metals • PARCO COMPOUND rust resistant • PARCO LUBRITE—wear resistant for friction surfaces • TROPICAL—heavy duty maintenance paints since 1883

Since 1914—Leader in the field

*Bonderite, Bonderized, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

How to automate step by step

Automation means many things to many people . . . ranging from the simple sequencing of individual operations to the completely automatic system.

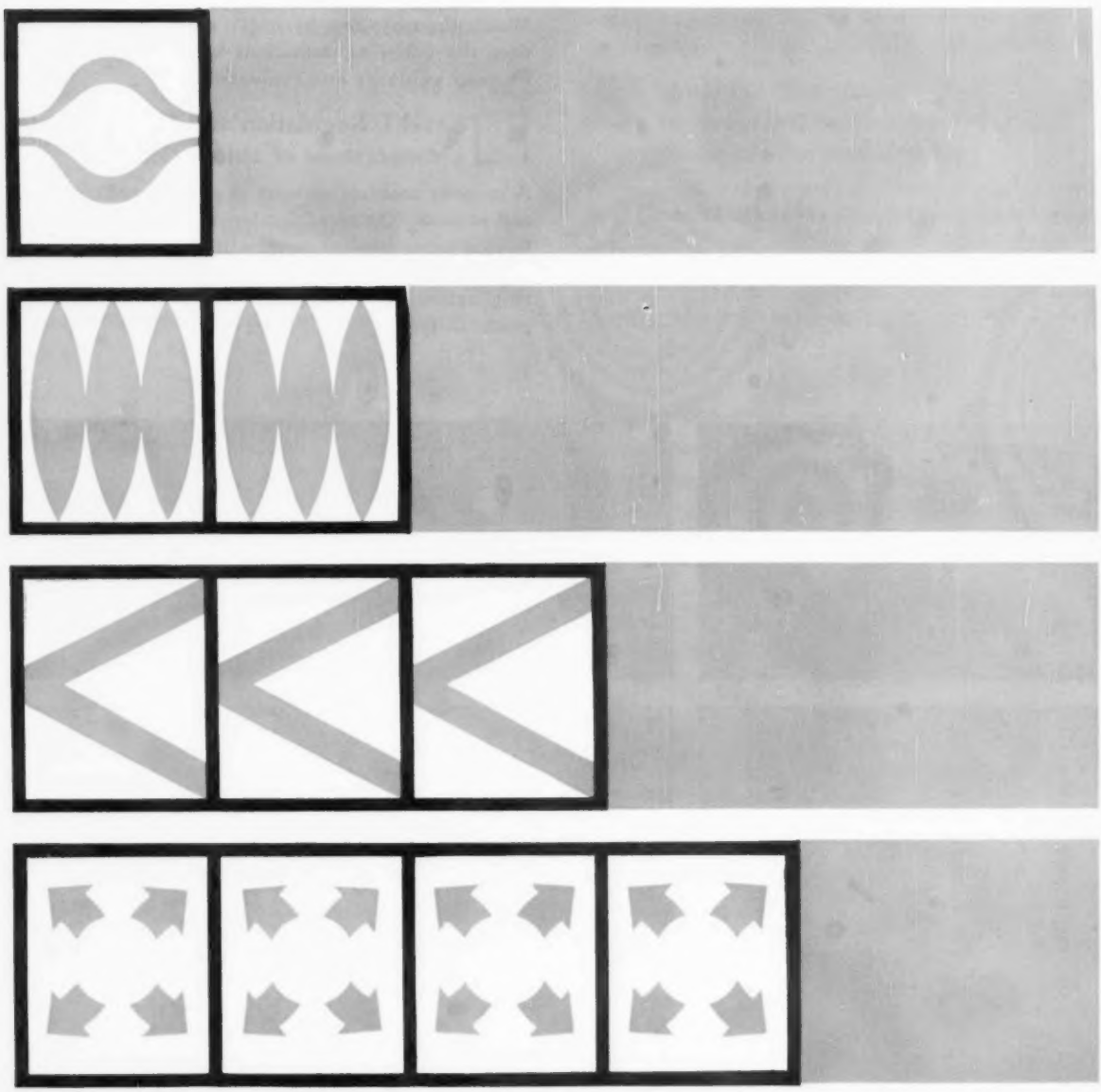
Westinghouse has chosen the term "Progressive Automation" to describe a step-by-step application and coordination of electric drive systems . . . executed in stages that are completely compatible to your cost-reduction, production quality and equipment modernization goals.

Such a step-by-step concept permits you to realize immediately higher mill rates, better steel quality and longer mill equipment life in those individual operations that are initially automated . . . and at the same time, moves you a big step closer to the full profit and production benefits of completely automated facilities.

Westinghouse, the leader in this field, is ready to work with you at whatever level you are currently concerned with . . . from simple process regulation to ultimate continuous decision-making computer control.

What level of Westinghouse's "Progressive Automation" meets your current needs best? Let's examine the definitions on the following pages . . .

Westinghouse



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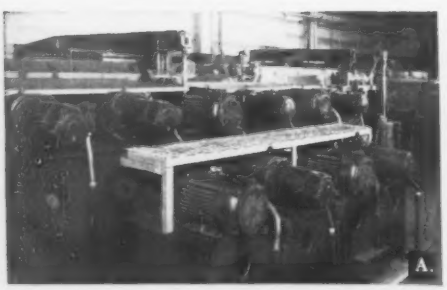
Westinghouse can help you plan the levels best for you . . . apply them as fast as you want

To properly relate your current operations to the Westinghouse "step by step" approach to automation, the following definitions have been developed for your guidance and evaluation:

Level I. Regulation and Gauge Control —cornerstone of automation

A properly coordinated team of power supplies, motors and controls—the operational muscles and brains—continually supervises and corrects process variables such as voltage, tension, speed, torque, position, dimensions and temperatures . . . for better product quality, greater productivity.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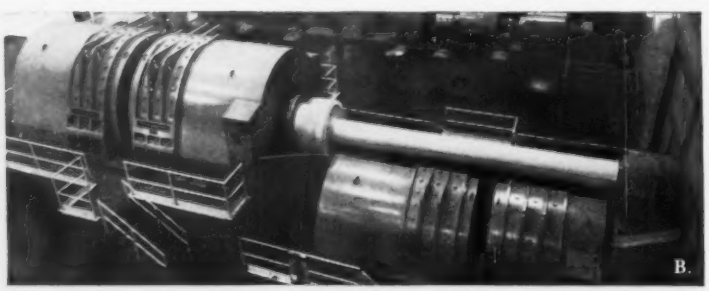
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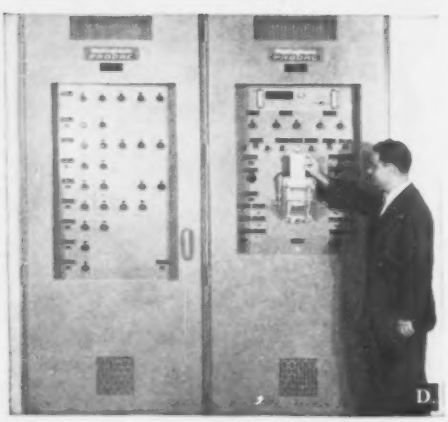
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Level II. Programming—the right action at the right time automatically

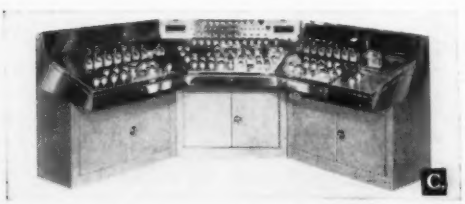
Pre-selection, by means of information contained on punched cards, tapes or manual setups, of the sequence of events and information needed by the regulating system, to control the process.

Level III. Data Logging—fast, precise information

Automatic collection and storage of operating and process information for use when needed—in the form needed. Data logging and display can provide immediate production data for quality control, etc., can record information required to re-program, and can operate as part of a computer in monitoring and optimizing mill performance.

Level IV. Computing—management control through automatic decision making

Continuous decision-making computer control which optimizes the mill operation by constantly monitoring and correcting the programming and regulatory systems. These corrections are required because of changes in process elements, environmental conditions, equipment loading, and other variables.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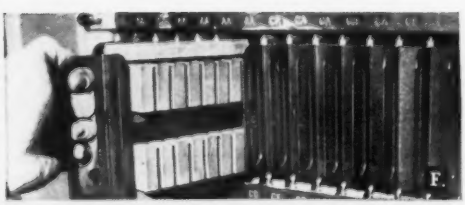
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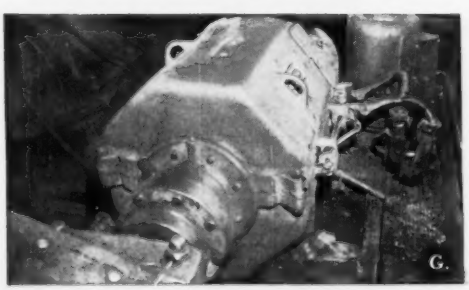

G.

Westinghouse products permit you to realize optimum results at every level of automation

A. Westinghouse Life-Line® motors and Moduline® gearing installed in cleaning section of 50-inch continuous annealing line.

B. Mill muscles are dependable Westinghouse motors with exclusive Thermalastic® insulation on armatures. This 12,000-hp twin drive is conservatively rated . . . designed for rugged rolling mill duty.

C. Typical operator's control pulpit for computer controlled mill.

D. Input portion of data accumulation system with manual switches on left—punched card reader on right.

E. Complete automatic mill operation is possible with Westinghouse on-line industrial Prodac® control computer.

F. Prodac module, representing a circuit function, is easily accessible for removal or replacement.

G. Westinghouse heavy-duty d-c mill motors provide power for toughest applications. On steel mill screwdowns, improved field coil design adds more copper for greater capacity and longer life.

For other considerations affecting your use of Westinghouse *Progressive Automation*, see the next page . . .

®Trademark

Westinghouse

How to apply Progressive Automation to your mills

Exactly where and how can you begin to blue-print your overall automation plan that will reap all these benefits for your production? The best answer is to begin with the best qualified source: Westinghouse, who has designed, built and installed more automatic production systems in steel mills than any other manufacturer.

Westinghouse—one source, one responsibility

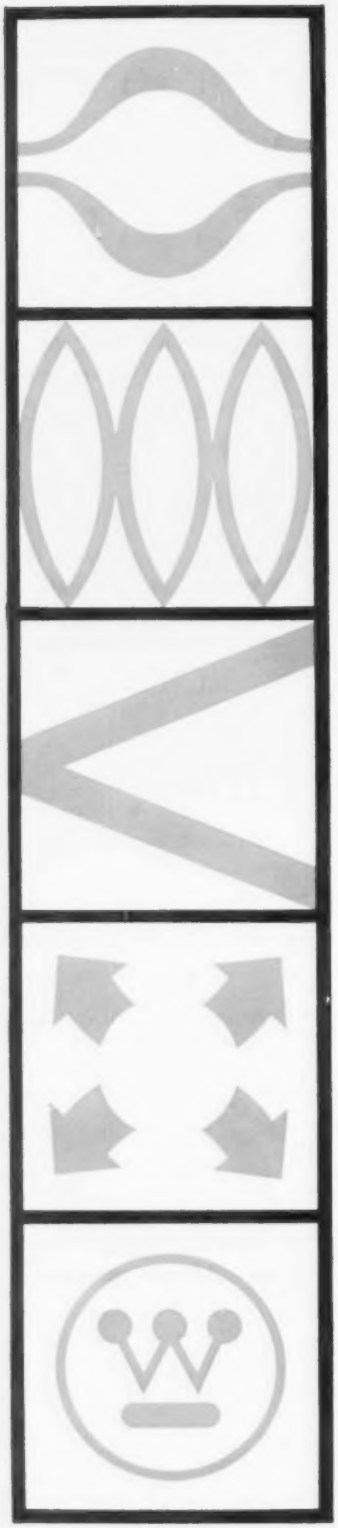
Westinghouse experience, facilities, engineering talent and equipment add up to your assurance of:

1. A sound analysis of your automation needs to determine the automatic systems best suited to your processes.
2. A coordinated systems approach of motors and controls, thoroughly engineered and completely tested, which integrates the stages of automatic production you need.
3. An automatic control system designed for application to your mill in line with the Westinghouse concept of *Progressive Automation*.
4. The use of the latest automation techniques and components—all adaptable to future developments and needed expansion.
5. A single source, a single responsibility for complete automation systems and related electrical equipment.

These complete Westinghouse facilities are available to you. Call your nearby Westinghouse representative, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania.

You can be sure . . . if it's Westinghouse

Westinghouse



Interested in more information on Westinghouse Progressive Automation for the steel industry? Write for B-8220, a complete set of new brochures describing Automation "steps" in detail as they relate to steelmaking operations. You can reserve a set for your use by indicating your area of interest on your company letterhead and mailing it to: Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa.

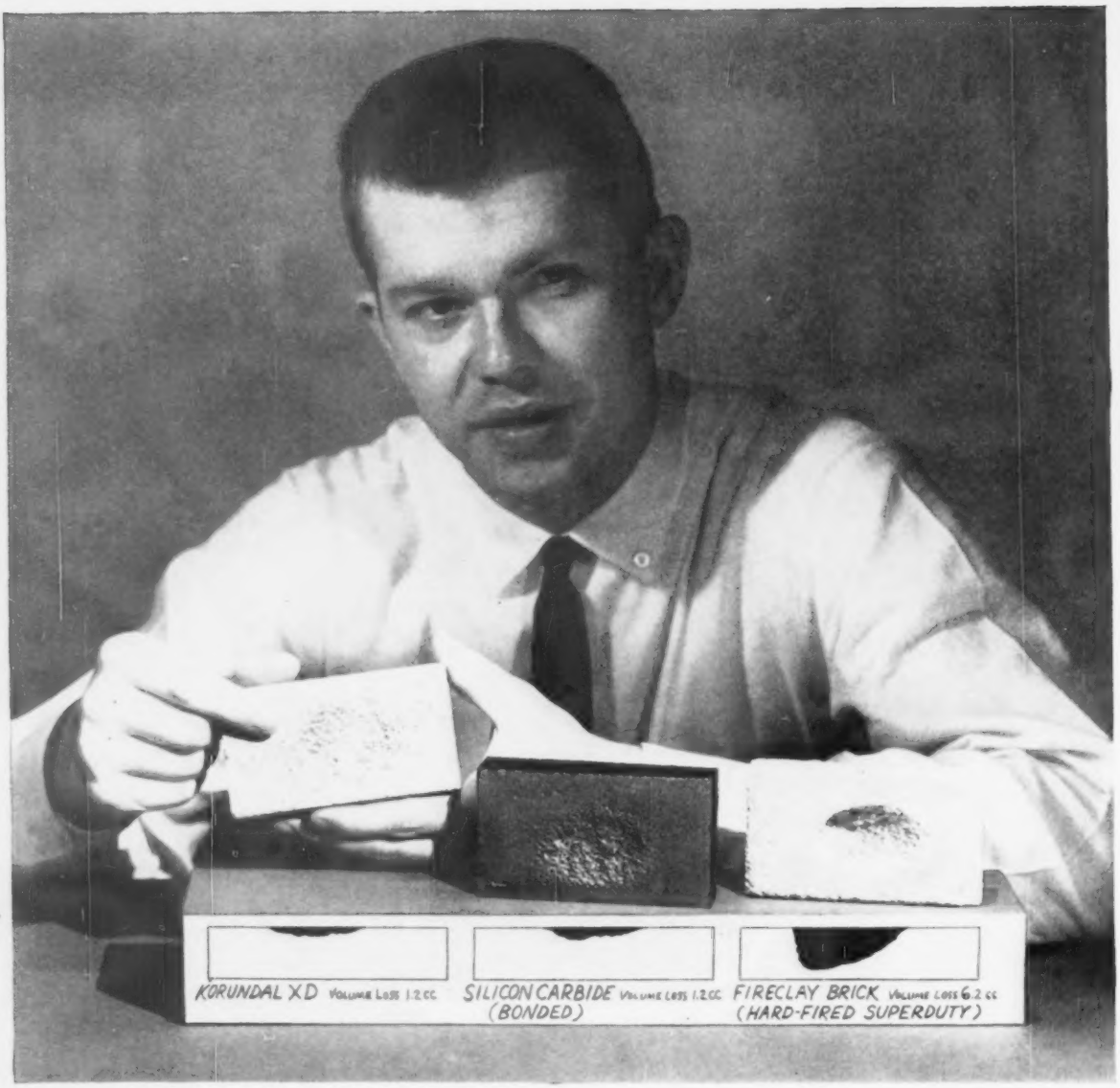
TURNKEY

The design and construction approach that can cut time and costs on your new plant—and KE is a master at it!

Turnkey means that one, universally-competent architect-engineer-construction firm takes your new plant or expansion project, from initial concept to start-up—*literally from A to Z!* Project phases typically include feasibility studies and site selection, plant concept and preliminary engineering, detail design, procurement, construction, start-up and maintenance. You enjoy the proved efficiencies of single-contract responsibility, and free your own key people from time-consuming attention to the project. In Steel, in Minerals, in Power Generation, in the Nuclear field—Kaiser Engineers' experience in turnkey projects is widely recognized. A call from you will bring a specialist in your industry to summarize how KE has performed for others, can save money and valuble time for you.

KAISER ENGINEERS engineers-constructors Since 1914

Oakland, California—Chicago, New York, Pittsburgh, Washington, D.C., Accra, Buenos Aires, London, Montreal, New Delhi, Sydney, Vancouver, Zurich


KORUNDAL XD VOLUME LOSS 1.2 CC
SILICON CARBIDE VOLUME LOSS 1.2 CC
(BONDED)
FIRECLAY BRICK VOLUME LOSS 6.2 CC
(HARD-FIRED SUPERDUTY)

Shaded areas show comparative material loss—resulting from identical blasting with silicon carbide grit in standard test.

Korundal XD—developed by Harbison-Walker—shows exceptional abrasion resistance

KORUNDAL XD refractory shows the same abrasion resistance as bonded silicon carbide. *And it costs less.* It's nearly five times as abrasion-resistant as hard-fired superduty fireclay brick, and has excellent resistance to oxidation.

The hardness of this new high-alumina refractory—plus other phenomenal physical properties—suggests its economical use in lining reheating furnace bottoms, blast furnaces, coke chutes, sinter line ducts, hot metal cars, open hearth mixers, soaking pits and for many other specialized applications. Write for complete technical information.

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
General Offices: Pittsburgh 22, Penna.

HW 61-13

World's Most Complete Refractories Service

WANT TO SPEED FORMING OPERATIONS?

You specify the shapes...

ERIE WILL BUILD THE PRESS

When you have unusually shaped parts to position for assembling, forming, forcing, straightening and similar operations, an Erie C-frame hydraulic press may be the all-purpose machine you need. Open on three sides, the C-frame design provides maximum accessibility to the work area. It eliminates the restrictive caging normally caused by support rods or frame castings.

Custom-designed Erie C-frame hydraulic presses can be manufactured to meet unusual requirements. Both horizontal and vertical frame machines have been built for high-speed production in capacities to 500 tons.

Standard Erie C-frame hydraulic presses are also available in a range of sizes, with capacities up to 250 tons.

Erie C-frame hydraulic presses have all steel welded frames to assure a high safety factor with minimum deflection. Power units are built in. Sensitive controls include dual hand and foot levers to provide accurate operation in either direction.

For the complete story, phone or write Mr. Carl Hammon, Erie Foundry Company, Erie 1, Pa. Ask for Bulletin 370.

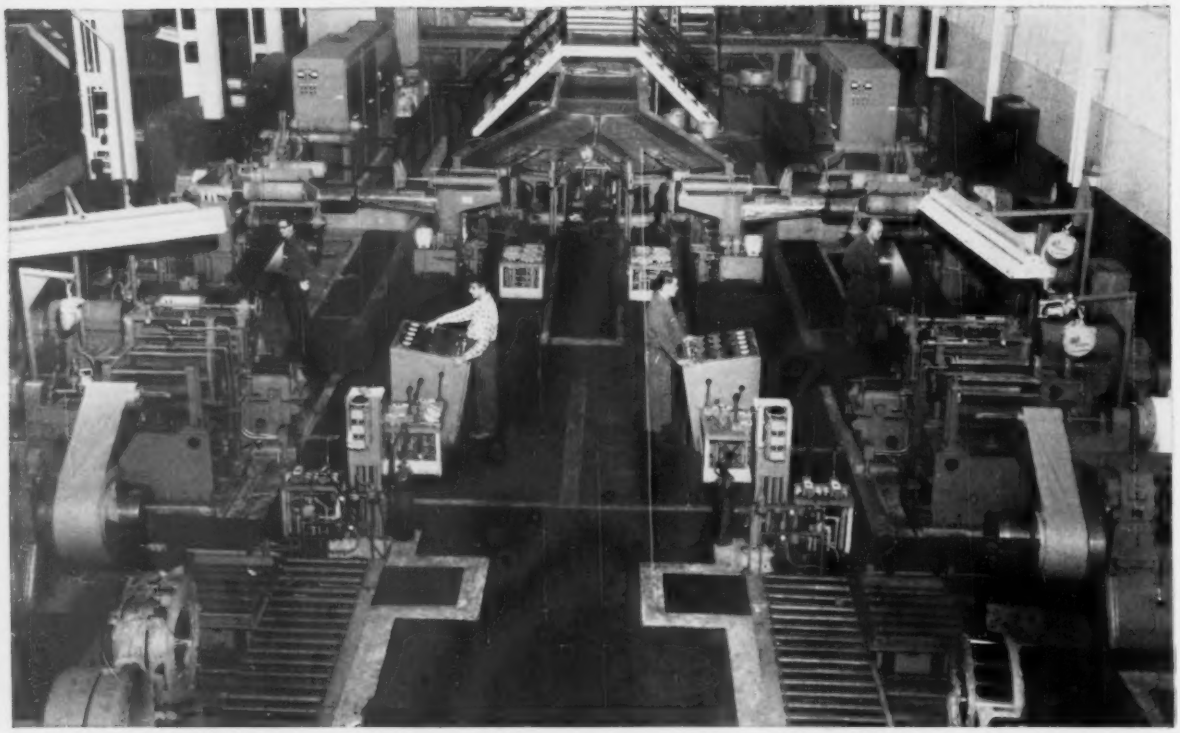
ERIE

ERIE FOUNDRY COMPANY

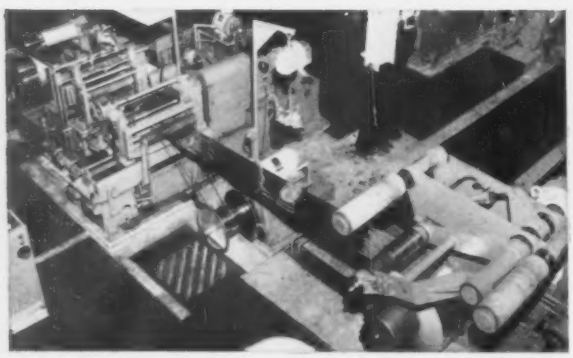
ONE OF THE GREAT NAMES IN FORGING SINCE 1895

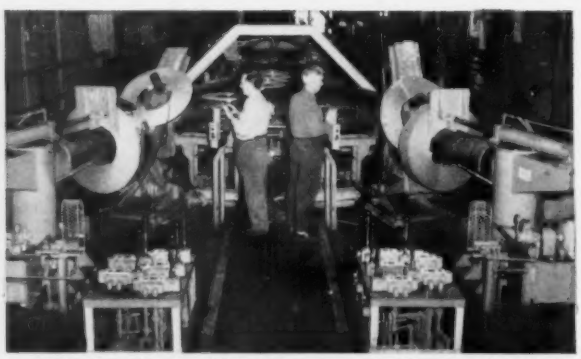
EF-60-04

Manufacturers of Forging Hammers • Forging Presses • Hydraulic Presses • Trimming Presses



Predictable Performance...





SECO Slitting Installation, Superior Steel Division, Copperweld Steel Company, Carnegie, Pa.

is automatic—start to finish—with a SECO *Slitting Line*

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

Affiliated with Lee Wilson Engineering Co., Inc.

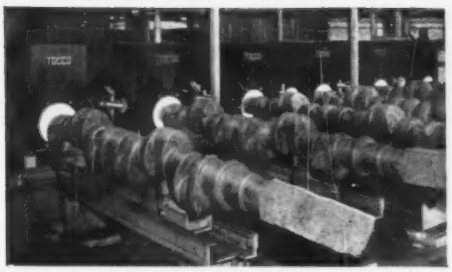
SECO

Every operation in this *complete* slitting line by SECO—from entry to exit of coils—is fully automated. It was specifically designed and built by SECO to meet the maximum performance requirements of the Superior Steel Division, Copperweld Steel Company, Carnegie, Pennsylvania.

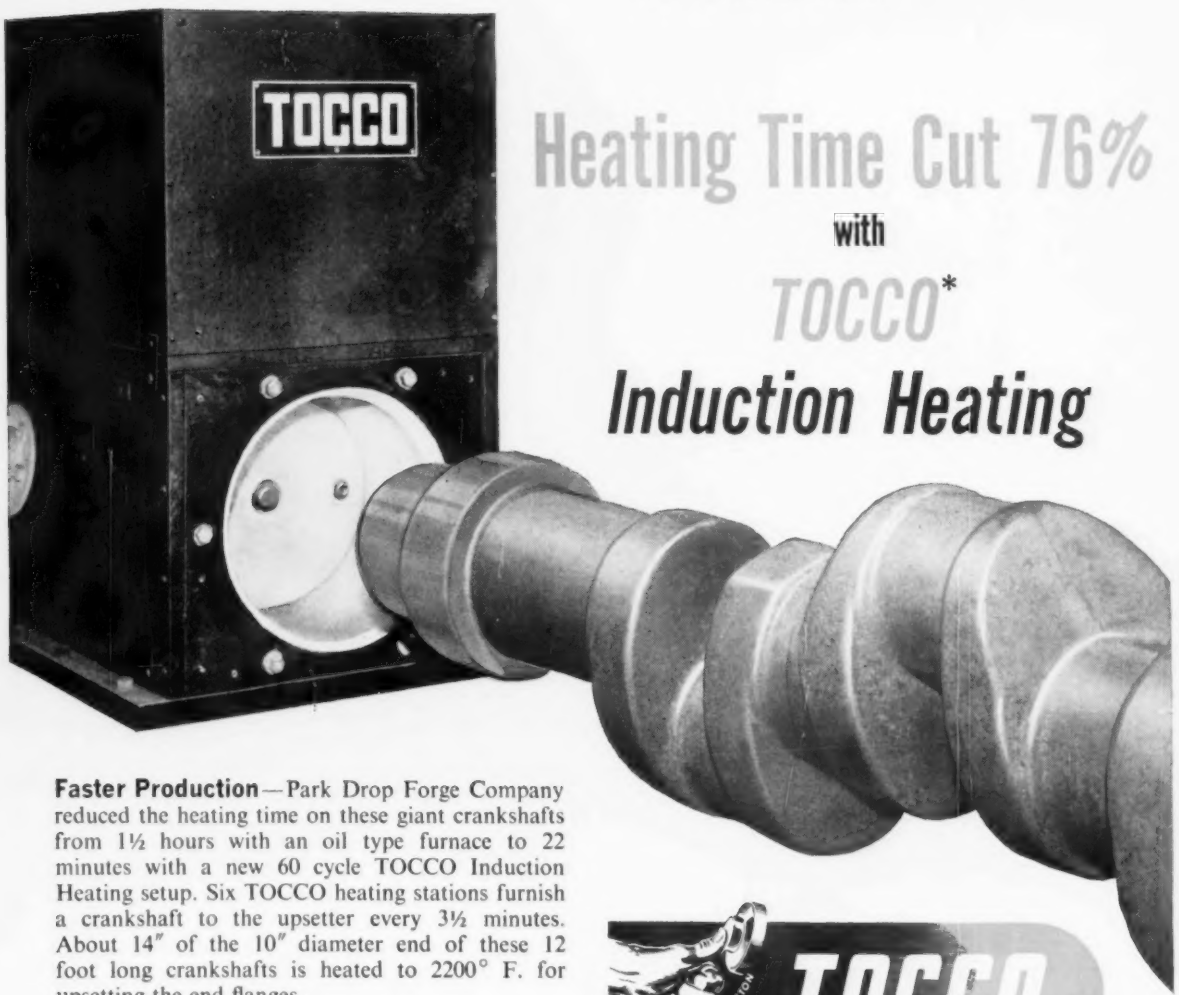
SECO's staff of experienced sales engineers, specialists in production problem solving, are prepared to show you how you can get "predictable performance" in *your* operation—whatever your requirements. Call or write today. West Coast representative: United Machine Tool Company, Los Angeles, California.

STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION • CLEVELAND 22, OHIO



Diesel locomotive crankshafts, each weighing nearly 3000 pounds, being heated for upsetting the end flange at Park Drop Forge Company.



Heating Time Cut 76%

with

TOCCO* Induction Heating

Faster Production—Park Drop Forge Company reduced the heating time on these giant crankshafts from 1½ hours with an oil type furnace to 22 minutes with a new 60 cycle TOCCO Induction Heating setup. Six TOCCO heating stations furnish a crankshaft to the upsetter every 3½ minutes. About 14″ of the 10″ diameter end of these 12 foot long crankshafts is heated to 2200° F. for upsetting the end flanges.

Other Advantages—Park Drop Forge engineers report practical elimination of scale which vastly increases the life of expensive upsetter dies. Also better metal flow is obtained because of TOCCO's uniform heating.

Most importantly, working conditions are greatly improved because of TOCCO's lack of radiant heat and gases. Workers can now perform all day—even on hot summer days—an impossibility with the old oil furnaces.

If you have a metal heating problem—forging, heat-treating, brazing, soldering or melting—why not investigate TOCCO for fast, economical results.

JUST PUSH A BUTTON

TOCCO

*Trade Mark Reg. U.S. Pat. Off.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept. A-8, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating for Forging and Forming"

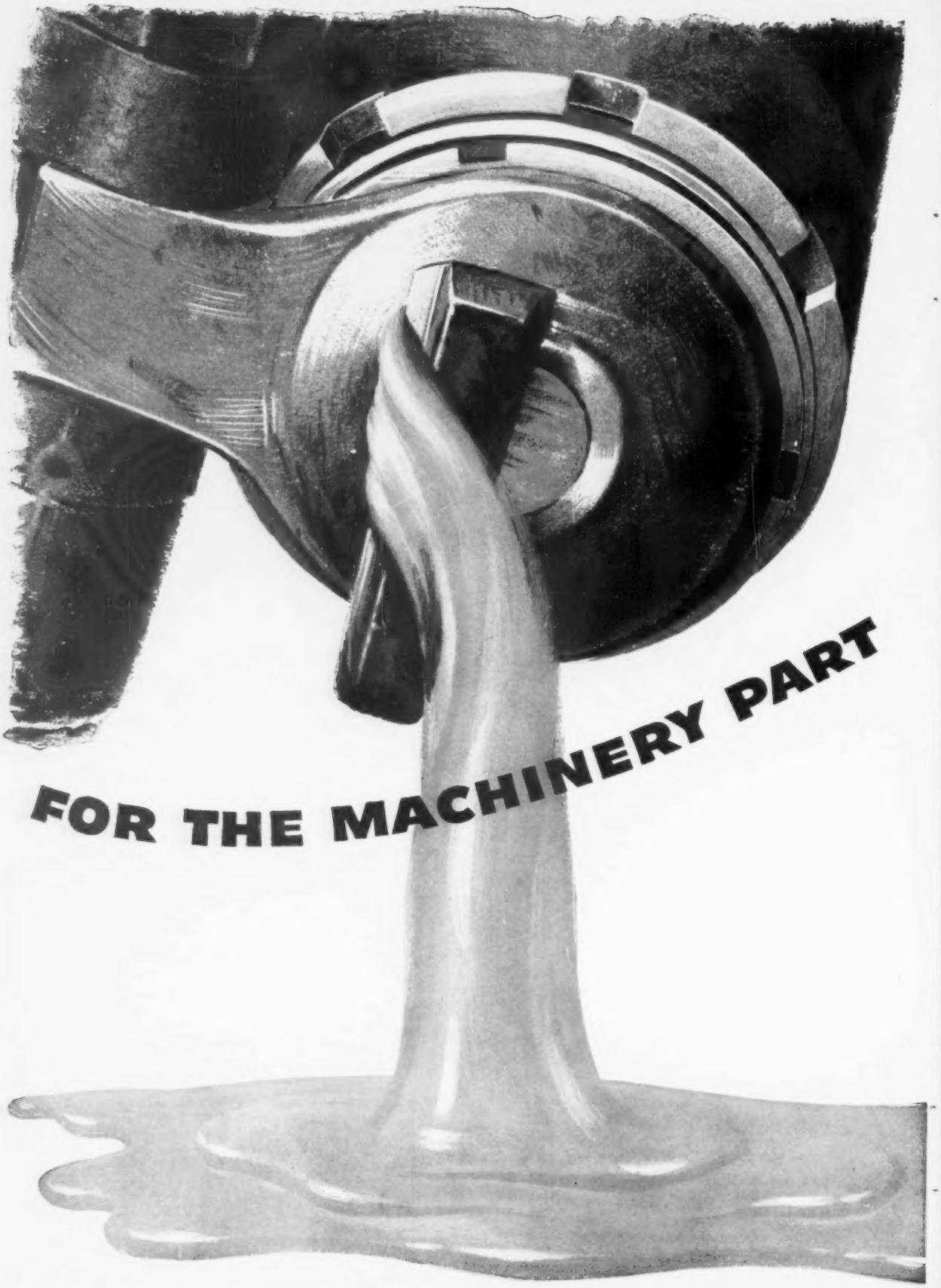
Name_____

Position_____

Company_____

Address_____

City_____ **Zone**____ **State**_____


FOR THE MACHINERY PART

THAT TAKES THE BEATING

A cut-off knife made of HAYNES STELLITE alloy No. 19 slices through molten glass at 2200 deg. F. Despite the intense heat of the glass being molded into tumblers, and the severe erosive action of the glass on metal, the cut-off knife maintains a 0.015-in. clearance between itself and the mold ring . . . *far longer than any other material ever used.*

Are you looking for a tough metal part to improve your machinery? It will pay you to look into HAYNES alloys. There are more than 15 from which to choose, including HAYNES STELLITE cobalt-base alloys, HAYNES iron-base alloys, HAYSTELLITE cast tungsten carbide, and HASTELLOY nickel-base alloys. They are available as castings, forgings, completely fabricated parts, or as sheet and bar stock. Parts can be furnished machined or ground to specified size and finish.

Our engineers will help you pick the right HAYNES alloy to resist many conditions of wear, heat, or corrosion.

HAYNES Alloys *will do the job!*

HAYNES ALLOYS

HAYNES STELLITE COMPANY

Division of Union Carbide Corporation

Kokomo, Indiana

UNION CARBIDE

The terms "Haynes," "Haynes Stellite," "Hastelloy," "Haystellite" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

TYPICAL "HAYNES" ALLOY MACHINERY PARTS

Tough, long-lasting metal-cutting saws over 20 inches in diameter, made of HAYNES STELLITE alloy sheet, slice the tops off copper ingots.

Steam atomizer fuel burner nozzles of HASTELLOY alloy C resist corrosive agents and erosion for months, retaining essential contours.

High-temperature strength and corrosion resistance of diesel combustion chambers made of HASTELLOY alloy C make them "good for life of the engines."

Three great names in couplings

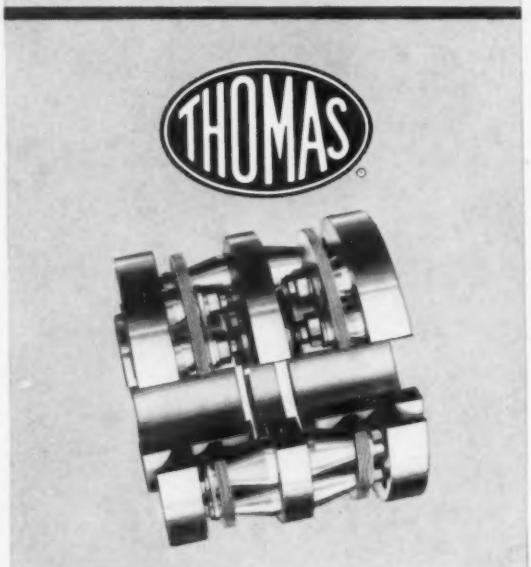
NOW CARRY THIS CORPORATE SYMBOL

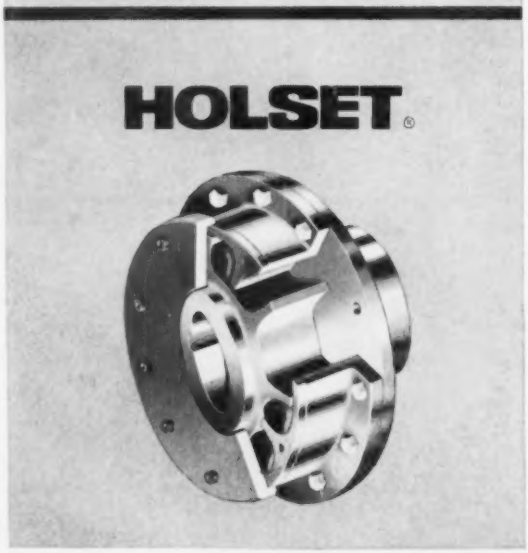
KOPPERS®

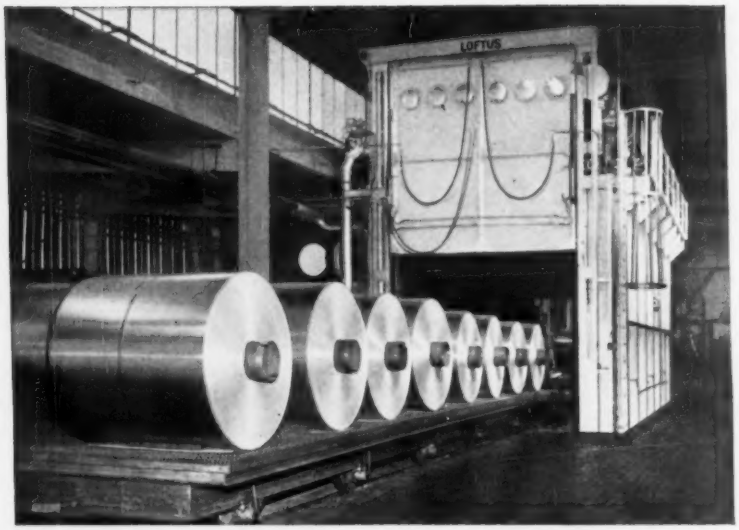
With the acquisition of the Thomas Flexible Disc Coupling line, Koppers now provides engineering solutions to a wide range of industrial coupling problems. Need a lubricated gear-type coupling for transmitting high loads? Koppers world-famous Fast's coupling line does the job on shafts up to 32 inches. Need a maintenance-free flexible-disc coupling with no backlash? The highly engineered Thomas line holds the answer—with miniature couplings as small as 1/12th of an ounce. Need a coupling to absorb impact or vibration? The Holset line of resilient, non-lubricated couplings protects equipment in most diesel, compressor and shock load applications.

Because each of these coupling lines has its particular application in industry . . . and because each is a recognized name in the power transmission field . . . you can continue to buy them by brand—just as you have in the past. Of considerable importance are the experienced, extensive engineering and manufacturing services of the entire Koppers organization that are available to help you with your power transmission problems . . . in any size, in any quantity, for any use.

KOPPERS COMPANY, INC.
COUPLING DEPARTMENT
Baltimore, Md. • Warren, Pa.
Engineered Products Sold with Service







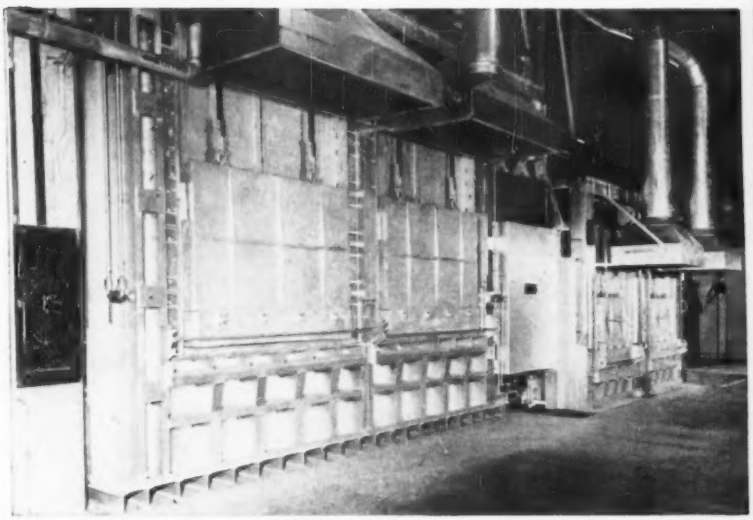
LOFTUS *Aluminum* FURNACES

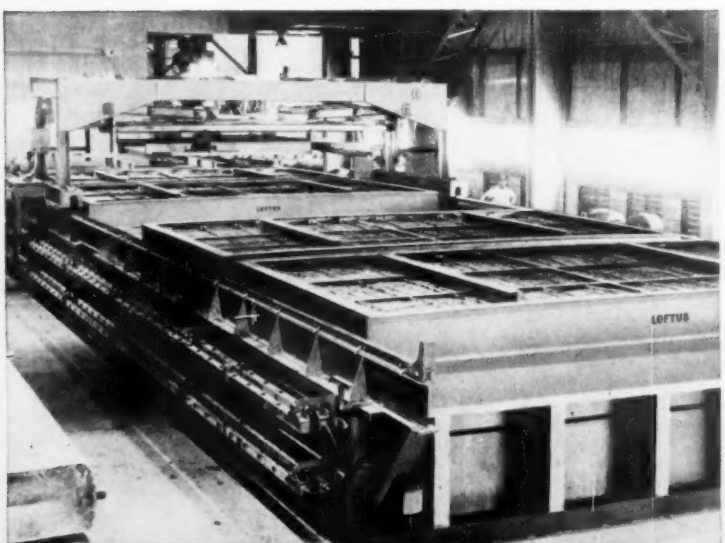
for
melting, holding,
reheating, annealing,
homogenizing

The many repeat orders for Loftus furnaces are the best evidence of customer satisfaction. Loftus furnaces offer:

- **High Production**
- **Economical Operation**
- **Low Maintenance**
- **Rugged Construction**

Whether building or expanding, you too can benefit from the wealth of experience available from Loftus.





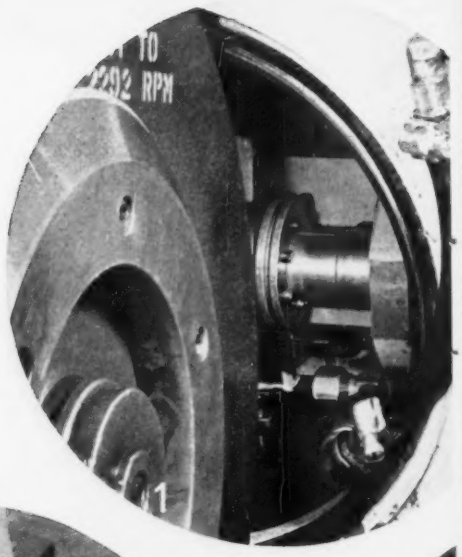
Loftus custom-builds complete plants and specializes in furnaces of all types and sizes for both ferrous and non-ferrous metals. Whatever your requirements, it will pay you to call on the engineering and construction know-how developed by Loftus over more than two decades of service to American metal producers.

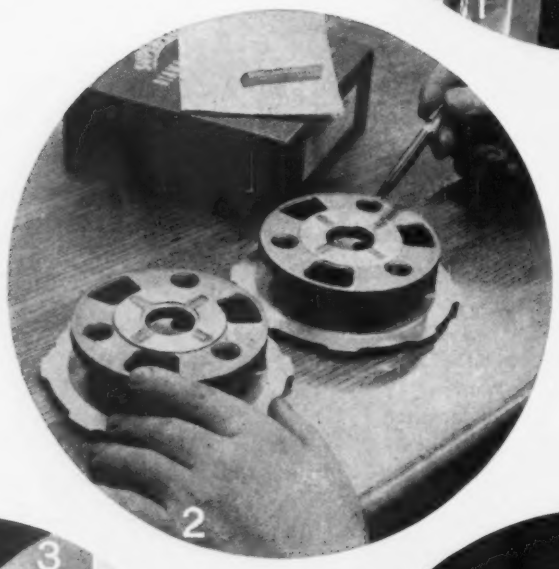
From first heat to heat treat, look to

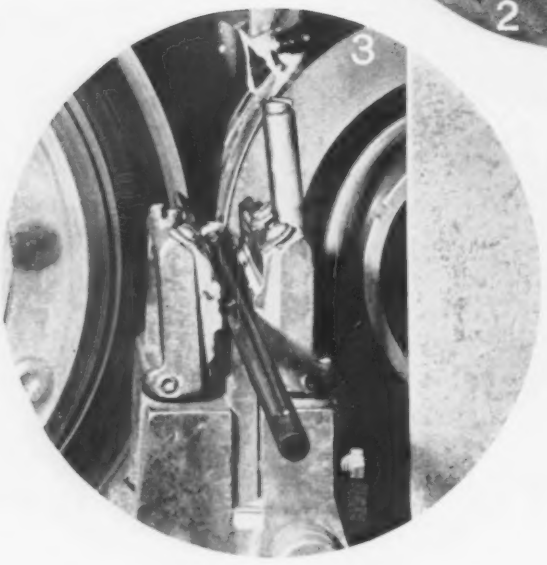
LOFTUS

Engineering Corporation

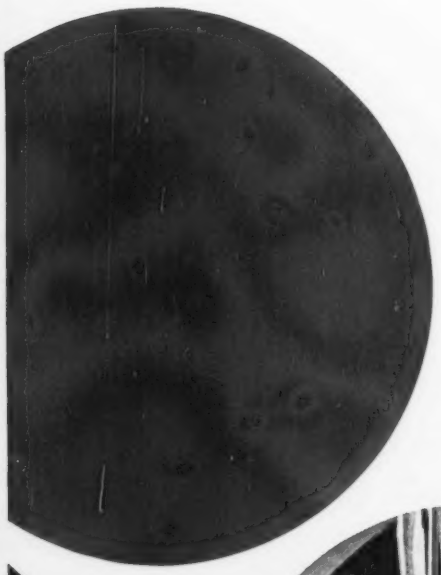
1 Gateway Center, Pittsburgh 22, Pa.







Industrial Distributors (Sales), Ltd.



Each of these jobs is done better and cheaper with natural diamonds

Here are four cutting and grinding operations being performed with industrial diamonds.

Three of them were once done with other kinds of tools. One couldn't be done at all, were it not for the unique *combination* of properties that only diamonds possess—excellent cutting ability coupled with fantastic endurance.

Result: your people spend less time changing tools, more time actually producing.

If you cut, sharpen or smooth in your business, you can probably use diamonds to advantage. Test them against the method you're using. You'll find out how efficient — and economical — a diamond can be, especially now.

Best grit for metal-bond wheels developed by the Diamond Research Laboratory in Johannesburg

A new impact crushing method for natural diamonds is producing the strongest and most durable diamond grit ever obtained for metal-bond wheels. Your tool and wheel manufacturer is ready to help you select the diamond tool that's right for *your* job.

1 **Dressing Grinding Wheels** *that groove propeller shafts for Evinrude Motors, Milwaukee. Cutters are powdered metal matrix impregnated with small, blocky natural diamonds. They show no wear after months of use.*

2 **Boring and Facing Aluminum** *pinion carriers for Chrysler Corporation, Detroit. Dimensions are held within ±.001 inch, producing finishes to 20 microinches. Conventional tools could not withstand aluminum's abrasiveness, nor meet these tolerances.*

3 **Grinding Synthetic Sapphire** *and quartz rods with diamond grinding wheel. Tolerances for diameters: ±.0002 inch; concentricity: ±.0002 inch. After trying every other grinding method, this diamond-coated unit was installed by Duncan-Inglewood, Inc., Inglewood, Calif. Rods are now being turned out on a production basis.*

4 **Band-Sawing Optical Glass.** *New diamond-coated band-saw blade cuts optical glass to pattern shapes at Dia-Chrome, Inc., Glendale, Calif. Diamond band saw can also cut reinforced plastics, ceramics, marble. Thin materials can be cut without coolant; dense materials require water or water-oil emulsion.*

Industrial diamonds cut practically everything . . . especially your production costs

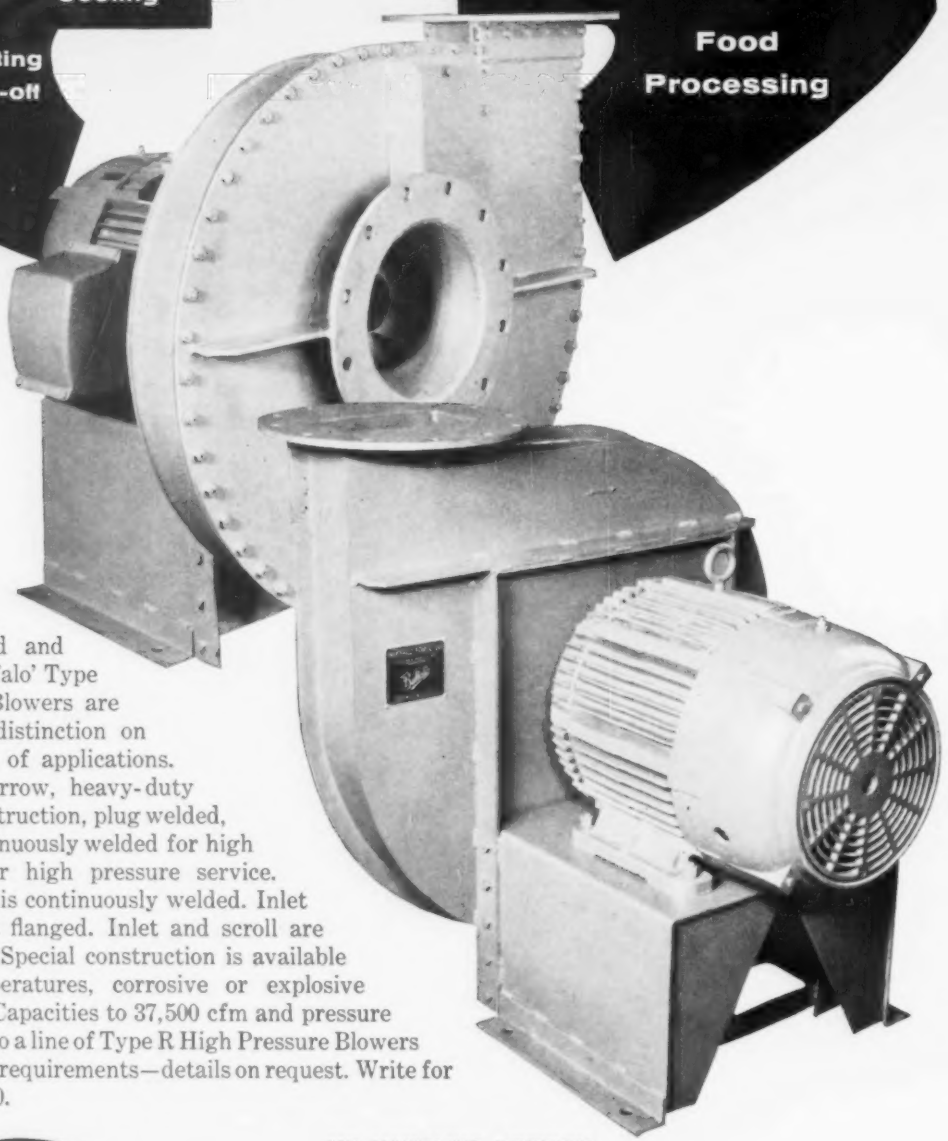
FOR THESE APPLICATIONS

Pneumatic Conveying
Glass Blowing
Air Compression
Furnace Blowing
Testing Blocks
Gas Boosting
Cooling
Drying
Gas Exhausting
Scale Blow-off

'BUFFALO' PRESSURE BLOWERS

FOR THESE INDUSTRIES

Chemical
Steel
Glass
Textile
Food Processing



Rugged, ribbed and gas-tight, 'Buffalo' Type CB Pressure Blowers are serving with distinction on a wide variety of applications. Wheels are narrow, heavy-duty steel plate construction, plug welded, riveted or continuously welded for high strength under high pressure service. Housing scroll is continuously welded. Inlet and outlet are flanged. Inlet and scroll are mastic sealed. Special construction is available for high-temperatures, corrosive or explosive atmospheres. Capacities to 37,500 cfm and pressure to 74" w. g. Also a line of Type R High Pressure Blowers for specialized requirements—details on request. Write for Bulletin FI-310.

AIR HANDLING DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

Canada Pumps Ltd., Kitchener, Ontario

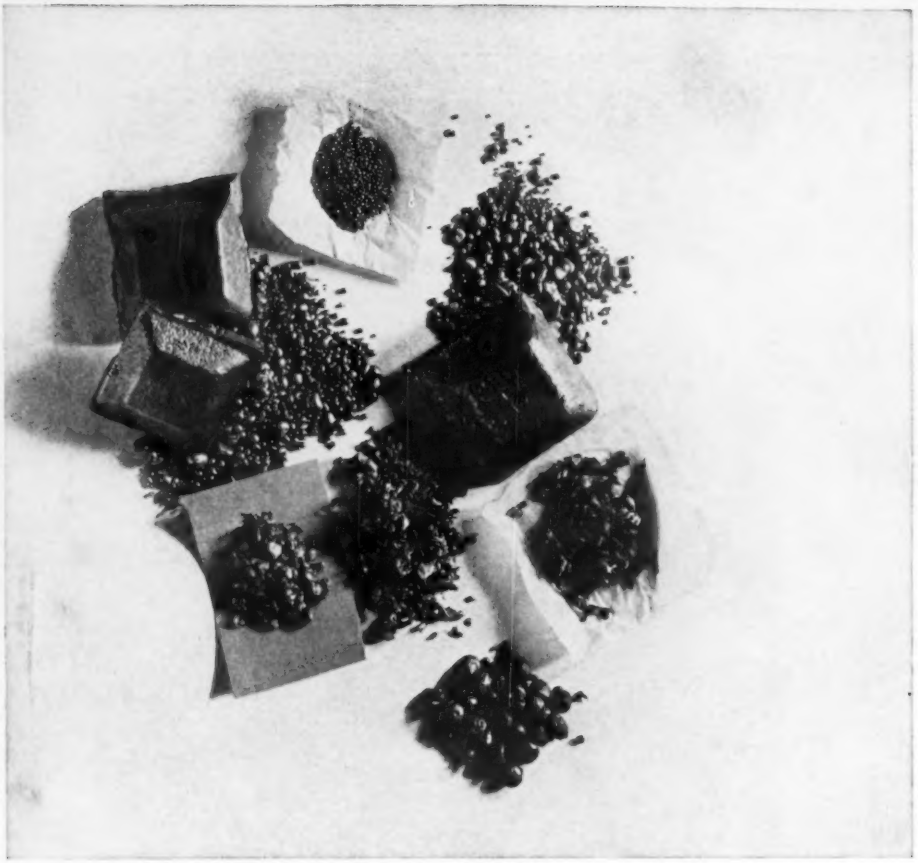
'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

ASARCO ALLOY ADDITIVES



Improved alloys at less cost with "ready to add" master alloys

Asarco alloying materials, produced under strict metallurgical controls, reduce alloying costs, improve casting performance, and contribute substantial savings in subsequent production costs.

BISMUTH is used to improve the dispersion of graphite in malleable iron castings. Available in shot, pellet and ingot forms.

SELENIUM improves machinability of stainless steel, controls its porosity. Asarco master alloys include ferro-selenium and nickel-selenium containing 50-60% selenium, and selenium powder.

TELLURIUM is used for degasifying, to minimize porosity, and improve machinability of stainless steel. It is also used for producing hard chilled iron castings. Ferro-tellurium containing 50-58% tellurium is available in chunk form. Tellurium is also available in powder, stick, slab and tablet forms.

Federated Metals Division produces and sells:

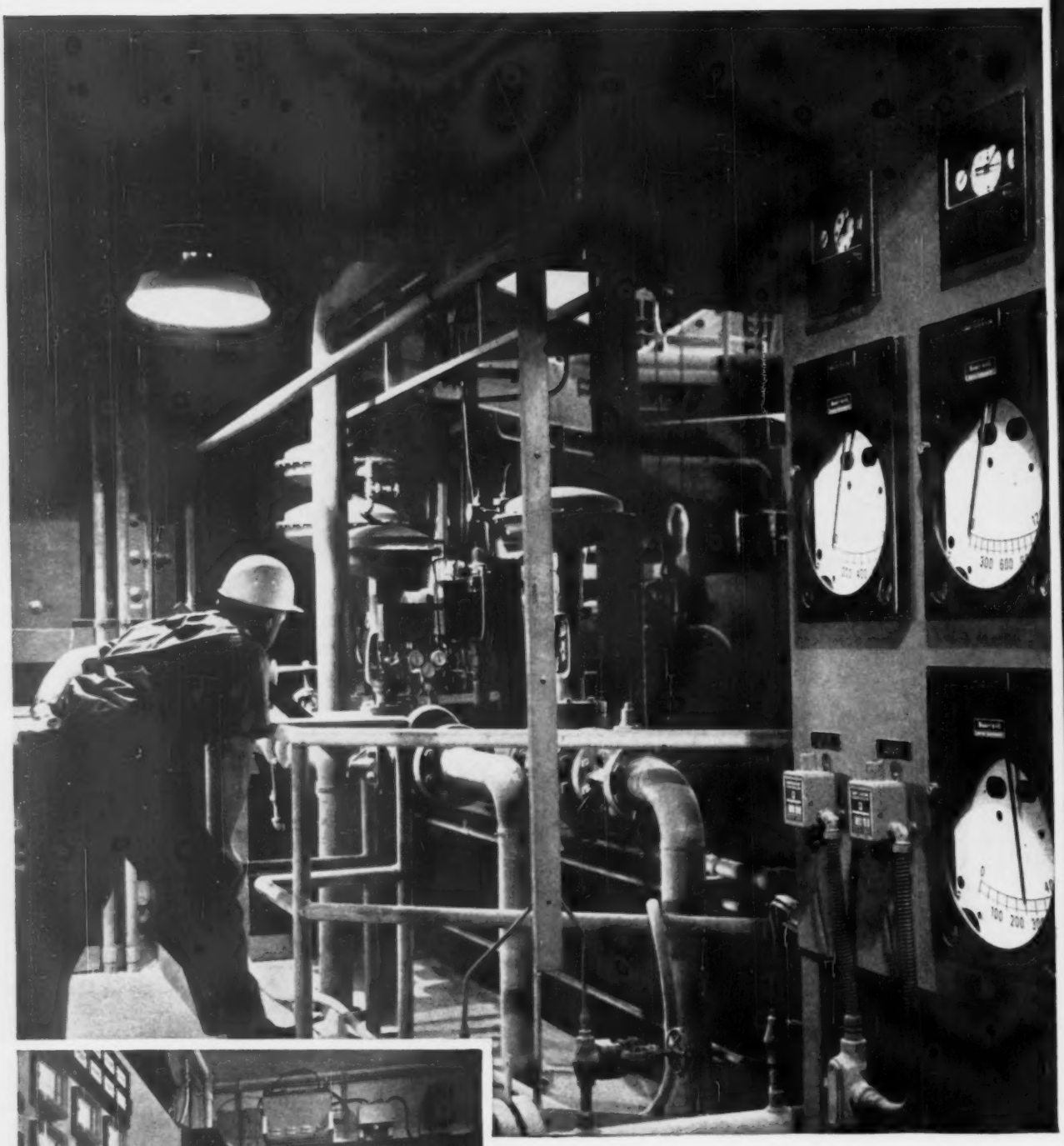
PELLET LEAD, readily assimilated into molten steel, dissolves into finely dispersed particles which lubricate and result in faster, smoother machining, longer tool life.

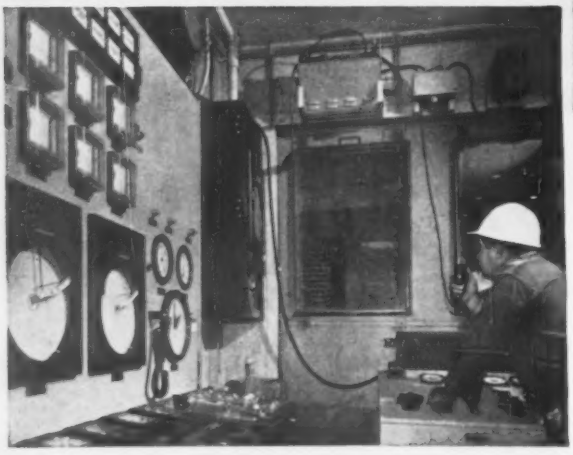
PHOSPHOR COPPER used as a deoxidizer, in shot or waffle form, improves castability, assures sharper detail, reduces porosity.

OTHER ALLOY ADDITIVES produced by Federated are: Aluminum, Arsenical Copper, Chromium Copper, Copper-Nickel Shot, Manganese Copper, Silicon Copper, Titanium Aluminum, Copper Magnesium, Copper Shot, Cadmium Copper, Copper Iron, Aluminum Copper.

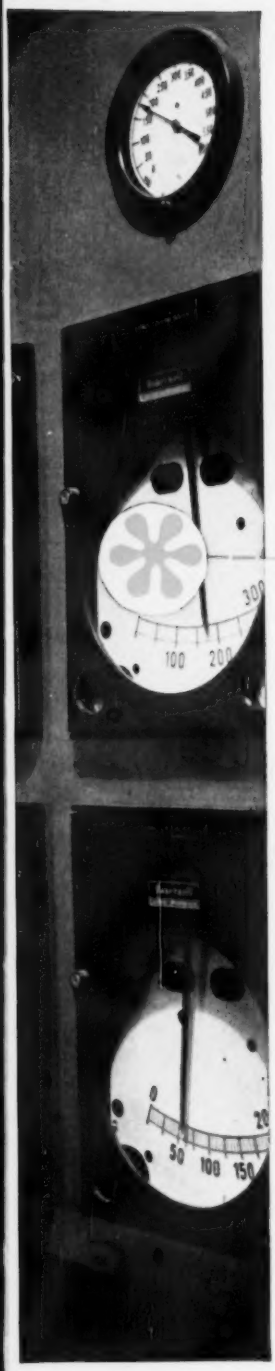
For complete information, write on your company letterhead to: Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, New York.

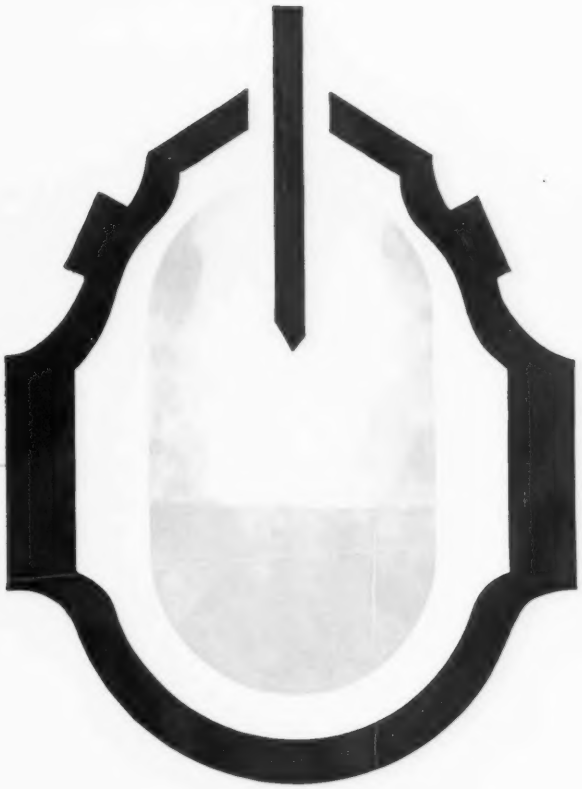
ASARCO





At Kaiser Steel Corporation, Fontana, California, this Honeywell system helps double plant capacity by controlling oxygen mass flow, lance position, lance cooling water temperature and pressure, and other critical variables. At left, an operator watches charging of one of the three new oxygen converters from a window in the control pulpit.





Why did Kaiser select Honeywell instrumentation for its L-D process?

At the Fontana plant of Kaiser Steel Corporation, Honeywell instruments were selected for the new basic oxygen steelmaking shop. This new process required instruments that were accurate, reliable, and fast enough to deliver the precise integrated control needed.

Kaiser Engineers called on Honeywell to furnish the necessary control instruments.

If you're planning to use the oxygen process—in converter or open hearth—you'll find it profitable to have Honeywell design your entire control system, complete from primary elements to computer, and tailored to the particular requirements of your mill. Your nearby Honeywell field engineer can give you complete details. Call him today—he's as near as your phone.

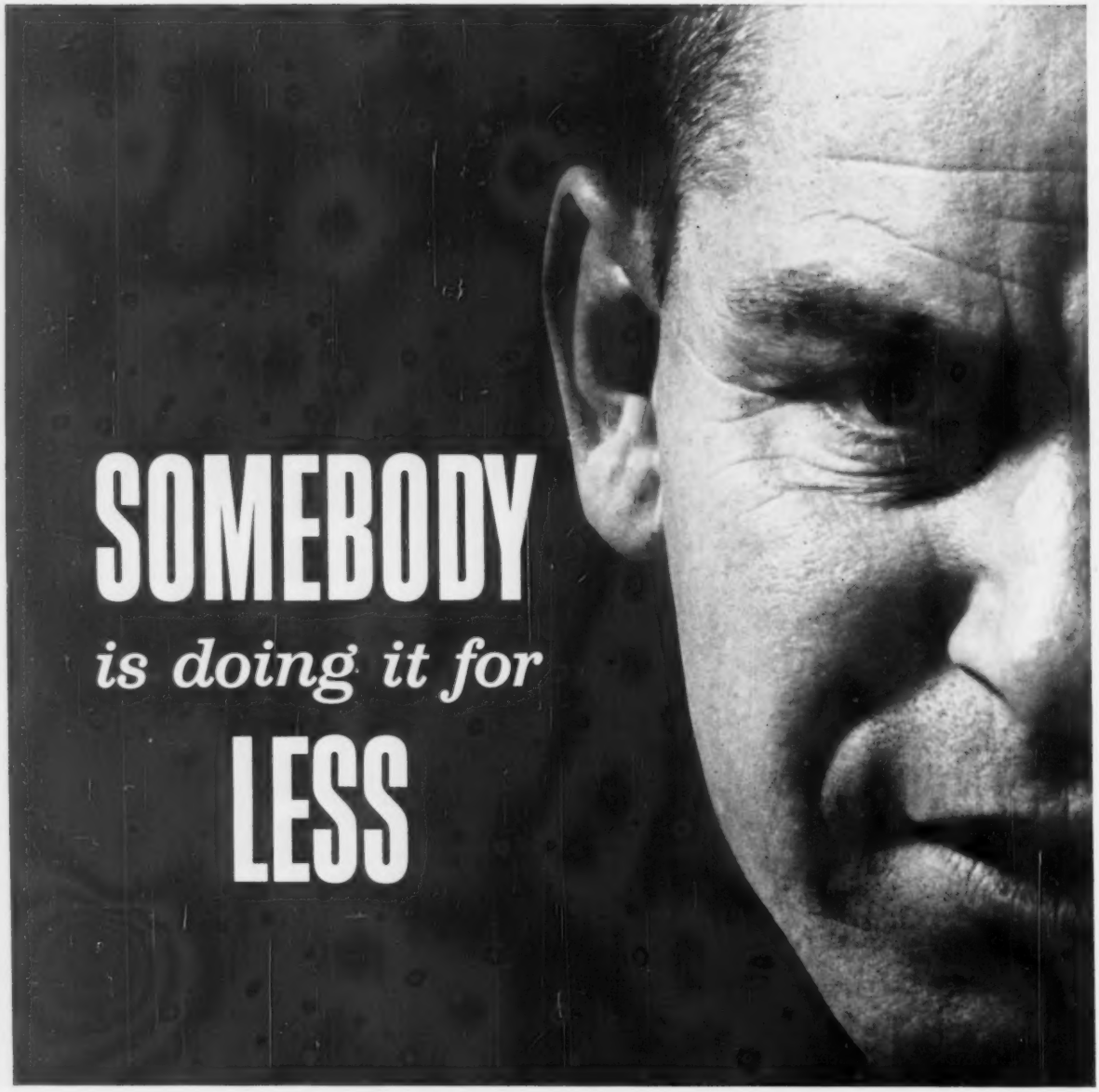
MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.

Honeywell

First in Control

SINCE 1885

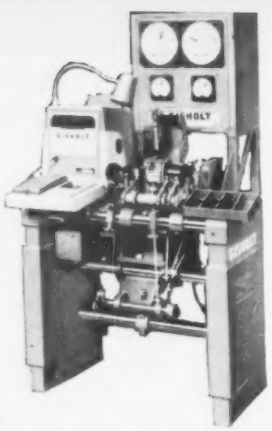
HONEYWELL INTERNATIONAL Sales and Service offices in all principal cities of the world. Manufacturing in United States, United Kingdom, Canada, Netherlands, Germany, France, Japan.



SOMEBODY *is doing it for* LESS

Gisholt MASTERLINE® 1S Balancer—Shown with separate unbalance location (angle) and amount meters for each correction plane. Readings hold until corrections are made. Offers complete plane separation—needs no special foundation—correction planes can be inside or outside work supports.

New HS line handles miniature, high-speed parts—impellers, armatures, gyros, self-driven assemblies.



Contact your Gisholt Representative, or write for Catalog 1215.

How long since you analyzed your balancing methods in light of recent developments?

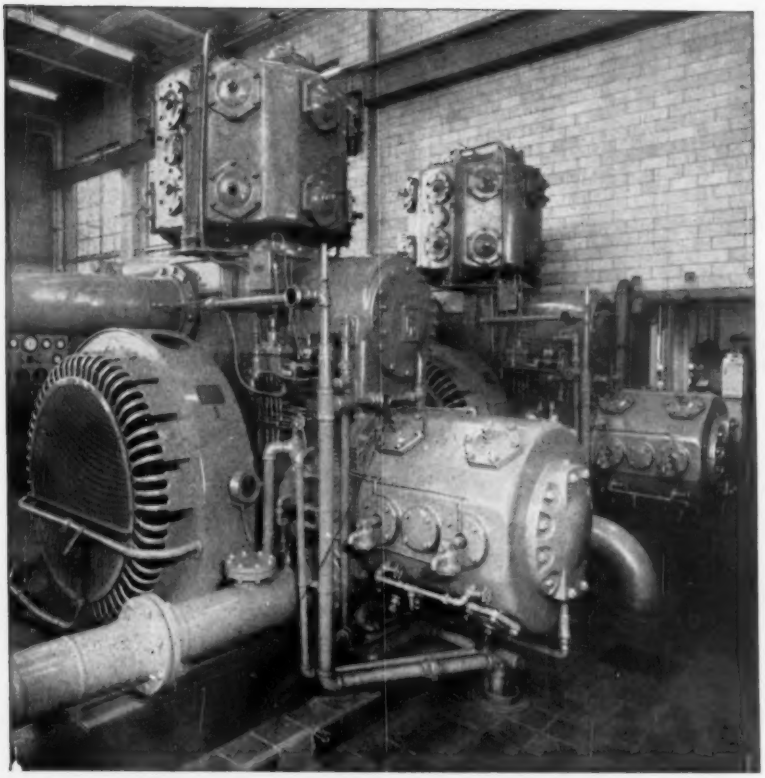
One year? Two years? Take a fresh look. If you still rely on operator skill or judgment, accuracy suffers, time is lost, reject rates or field failures are high.

With Gisholt balancers, guesswork is eliminated. You can locate, measure, correct and inspect in *one handling.*

Only Gisholt offers all the advantages you need to do it for less.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers® • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee



IN I-R COMPRESSORS,

TIME TELLS

THE DIFFERENCE

In these two XLE compressors, 21 Channel Valves have operated

45,482 HOURS

with no parts replaced!

The two Ingersoll-Rand XLE air compressors shown above are installed at a large midwestern automotive plant. They were started up in May, 1951, and at this writing have totalled 45,482 hours, mostly at 16 to 24 hours a day.

Of the 28 Channel Valves (14 per unit), 21 have operated full time with *no repairs*, merely being cleaned once a year. Each of the other seven valves had only one channel and spring replaced in all this time, during the scheduled inspection period. And all the valves are operating with their seat plates still on the first side – when the plates are turned over, their life will be doubled.*

The *extra value* that's built into every type of Ingersoll-Rand compressor pays off with *long-run economy*. Reduced maintenance and attention, over many years, mean long-range savings in the cost of air power. Ask your I-R representative for more information on the world's most complete line of compressors – in reciprocating, centrifugal, axial-flow, rotary and thermal types. There are units from ½ to 25,000 hp, for pressures from one micron to 125,000 psi. Call him now.

***Only I-R compressors have Channel Valves**
Known for high efficiency, quiet operation and exceptional durability. Entirely different. Each valve is a combination of rigid stainless-steel channels and bowed leaf springs, with trapped-air spaces which cushion action, prevent impact.

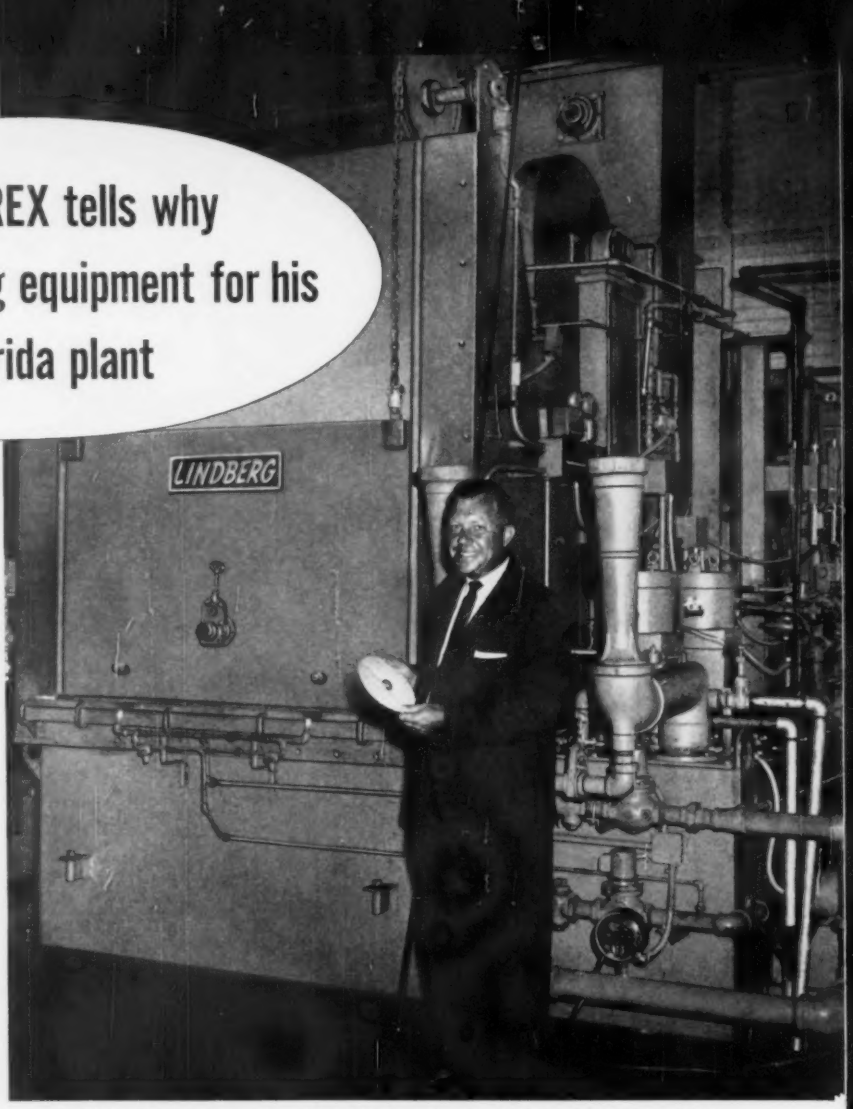
Ingersoll-Rand
11 Broadway, New York 4, N.Y.

The World's Most Comprehensive Compressor Experience

J. WALTER REX tells why he chose Lindberg equipment for his new Florida plant

QUOTE from Mr. Rex

"When we designed our new plant, Rex of Florida, Inc., we made sure we could provide the Florida metal working industry with complete heat treating services. After carefully surveying the industrial activities we would serve we knew we would be called upon to offer scientifically controlled, high quality heat treating for a variety of metals, both ferrous and non-ferrous, and an unusual diversity of sizes, shapes and weights. Our long experience with Lindberg furnaces and atmosphere controls assured us that we could depend on Lindberg equipment to help us meet most efficiently the widely varying demands of our Florida customers."



J. Walter Rex, President, Rex of Florida, Inc., Fort Lauderdale, with Lindberg high temperature, all-purpose furnace, one of six Lindberg units specified for this new plant. Mr. Rex, also President, J. W. Rex Company, Lansdale, Penna., is recognized as one of the foremost metal working authorities and his commercial heat treating operations are among the largest and most important in the country, particularly in treating components for rockets and missiles.

Latest Rex purchase from Lindberg—new vacuum furnace for Lansdale, Penna., plant

Mr. Rex's confidence in the ability of Lindberg equipment to meet the most exacting commercial heat treating requirements is based on the years of efficient and dependable service rendered by Lindberg units in his commercial heat treating operations. He has been a Lindberg customer for nearly 20 years. We're glad that he has found our equipment so satisfactory. We're very well satisfied with Mr. Rex as a customer, too. Altogether, including the units for Rex of Florida, Inc., he has purchased 34 Lindberg units over the years.

Lindberg offers the most complete line of fuel-fired and electric furnaces and equipment for heat treating ferrous and non-ferrous metals available to industry. If you have any problem in heat treating, get your local Lindberg representative's help now. You can depend on his experience and Lindberg's engineering and design know-how to provide exactly the right equipment for your need. And it's easy, too! Just call your Lindberg Field Engineer (he's listed in your classified phone book) or write us direct. Heat Treating Furnace Division, Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois.

Los Angeles plant: 11937 S. Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg Ltd., 15 Pelham Ave., Toronto 9, Ont. Also, Lindberg plants in Argentina, Australia, England, France, Italy, Japan, Spain, Switzerland and West Germany.

LINDBERG
heat for industry

New
Allegheny Stainless
Bar Program
Means . . .

FAST DELIVERY

BETTER MACHINABILITY

UNIFORM
IMPROVED PROPERTIES

TOP QUALITY
PROCESSING

FAST DELIVERY—

5,000,000 lbs. of finished bars
8,000,000 lbs. of semi-finished stocks
to back-up distributor inventory

Allegheny Ludlum now stocks at the mill depots, Rounds, Hexagons, Squares, Flats and Forging Billets in the ten most popular grades that account for over 85 percent of all stainless bars made. This huge stock of over 2,500 tons backs up the large inventories carried by the authorized Allegheny Ludlum Distributors.

In addition to the finished stock, over 4,000 tons of quality checked rerolling billets and ingots in 30 grades are in inventory to cut delivery time and to insure predictability.

Each month, A-L publishes a Bar, Wire, and Forging Billet Stock List which lists the grades, sizes, and actual pounds of each in stock at the first of that month. It's available to you through the Steel Service Centers authorized to sell A-L Stainless Bars. For the names of the distributors in your area, just call the A-L District Office.

BETTER MACHINABILITY —

Research, Constant Testing and Controlled Processing Result in Greatly Improved Machinability and Uniformity . . . from Lot to Lot

Several years ago, A-L took a hard look at its own stainless steel bars. While quality was good, it could be made better and more uniform, particularly in the area of machinability.

One of the finest metalcutting laboratories in the country was retained to make independent, exhaustive comparative tests on A-L stainless bars and competitive bars. Ratings were based on tool life, determined by turning and drilling tests. A-L's Research Center, probably the largest in the stainless business, correlated these results with metallurgical factors such as composition, microstructural and mechanical properties.

From Research to the melt shops went instructions to revise and narrow the limits of composition. This, combined with processing changes, yields general purpose (stocked) grades with predictable, better machinability.

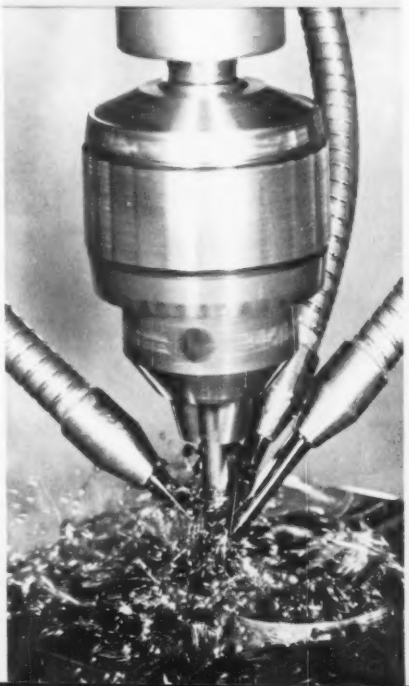
RESULT: Testing general purpose machining grades as made three years ago with the same grades made today shows better than a 50 percent increase.

ANALYSIS LIMITS

Allegheny Stainless composition limits, already much tighter than AISI Specifications, have been narrowed even further to improve the composition-sensitive machining properties of all A-L Stainless Grades.

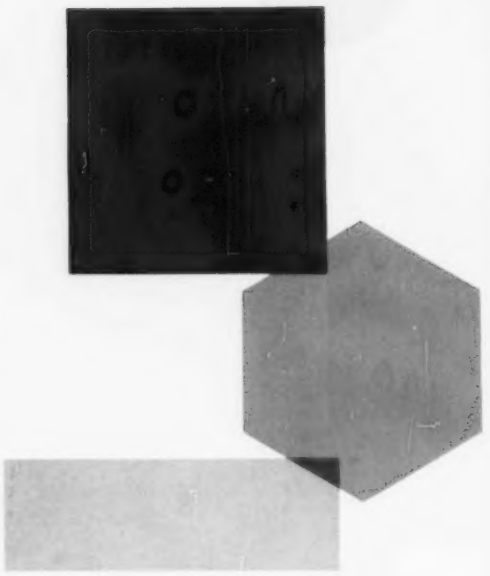
MACHINING TESTS

Exhaustive turning and drilling tests on stainless bars of all types pin-pointed the composition and processing variables that most affected machining properties, and made possible the adjustment of these variables for improved machinability and predictability of response from heat to heat. A continuing program of these machining trials serves as an additional safeguard to the quality and unmatched dependability of an A-L Stainless Bar.



TOP QUALITY PROCESSING—

Special Care and Special Equipment Mean Better Bars at Your Machines



What's been your big trouble with cold finished stainless steel bars . . . nicks and gouges, off-size, burred ends, grinding marks, damaged shipments? Glance over the panels at the right, and see how these common faults are eliminated from Allegheny Ludlum cold finished stainless bars.

These are precautions that make a difference between an A-L quality bar and all the others . . . quality you can see, and feel, and measure. Quality that shows up in bar automatics, in all your fabricating.

And this quality is no accident. A few years ago, Allegheny Ludlum investigated stainless bars from the customer's viewpoint. A-L teams held field interviews, toured customer's plants, watched stainless bars undergoing every conceivable fabricating operation. A good part of the trouble was in mill finishing. And A-L revamped their entire finishing operation to suit.

Special equipment is installed, and every operation becomes a matter of painstaking care. Rubber padding covers every work table and inspection table, lines every transfer buggy . . . chain and cable slings are eliminated, and soft rope substituted . . . cardboard collars are fitted to bars in process, to prevent rubbing and scratching.

Quality Audit Teams continually audit and maintain quality control standards by making pinpoint quality checks through every phase of production . . . right onto the shipping dock.

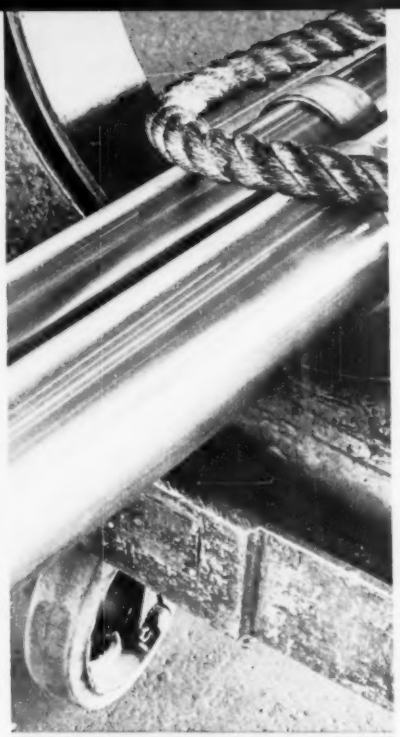
Many of these practices have been widely imitated in the industry. Some are still A-L exclusives. But, this is how quality is made . . . stainless steel bar quality . . . by the world's leading stainless steel producer.

HEAT NUMBERS ON EVERY BAR

Heat numbers stamped permanently on one end of the bar won't wear off, can't get separated. Square, clean-cut and deburred ends make use in bar automatics easier and make chucking simpler.

CONSISTENT SIZE AND STRAIGHTNESS TOLERANCES

A-L's famous quality control and inspection procedures mean greater uniformity . . . minimizes special handling in your plant.

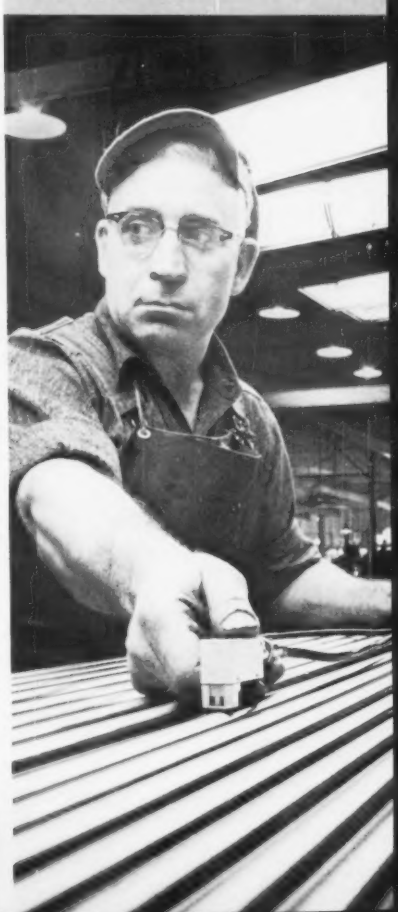


NICK-FREE, SCRATCH-FREE BARS

Nothing harder than cardboard, ropes or rubber ever touches finished A-L bars. Cardboard collars eliminate sliding, metal-to-metal contact . . . chain or cable are never used.

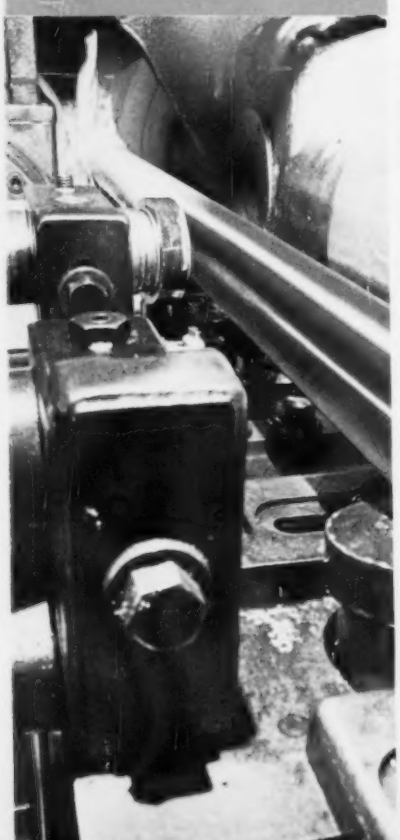
SMOOTHEST FINISH AVAILABLE

Consistent metal quality and careful finishing result in a surface vastly superior to the industry-accepted average standard.



CAREFUL FINISHING PAYOFF

Multiple passes through centerless grinders result in smooth finish—no spiral grind marks —no chatter marks.



PROTECTED SHIPMENTS

All bars are protected with cardboard collars and then the bundle is completely wrapped with triple-thickness waterproof paper to protect the superior finish during shipment. Reduces damage in transit.

And if You Want Something Special A-L is a Complete Bar Source

HIGH TEMPERATURE STEELS & ALLOYS

A-L stocks certain finished bars in the most commonly used high temperature steels and alloys plus a large stock of approved billets in these same grades. Needs for bars of A-286, 19-9DL, AM-355, Waspaloy, AL 901, R 41, S-816, M-252, etc., are usually quickly satisfied from this finished and semi-finished stock of Allegheny Ludlum.

FORGING BARS & BILLETS

Also in stock is a full range of forging-quality bars and forging billets from 4 to 30 inches Round Cornered Squares in a wide range of grades, all meeting appropriate specifications.

SPECIAL ANALYSIS AND PROCESSING

For special requirements, A-L is able to tailor-make properties to fit the end use. From knowledge gained in the machining research program, chemistry and processing can be varied to increase a specific property for a particular application. Improvements in such things as hot workability, cold workability, hardenability, finish after machining, improved machinability in non-free machining steels, mechanical properties, corrosion resistance, are examples.

It's something you should discuss with your A-L sales representative.

MACHINING AND HEAT TREATMENT DATA

A-L mill and research specialists are available, through the A-L sales representatives, for help and counsel on problems involving Allegheny Stainless Bars. Qualified machining engineers are at your service. These men devote their full time to provide the best service and assistance available anywhere.

NEW BAR BOOKLET

On the printing press now is A-L's new booklet, jam-packed with helpful information on using, heat treating and machining Stainless Bars. For a copy of this technical, data-filled booklet, check the A-L authorized distributor in your area, or the A-L Sales Office nearest you, or write: ***Allegheny Ludlum Steel Corporation, Department QIP 3, Oliver Building, Pittsburgh 22, Pa.***

ALLEGHENY LUDLUM

EVERY FORM OF STAINLESS EVERY HELP IN USING IT

SHORT ARC

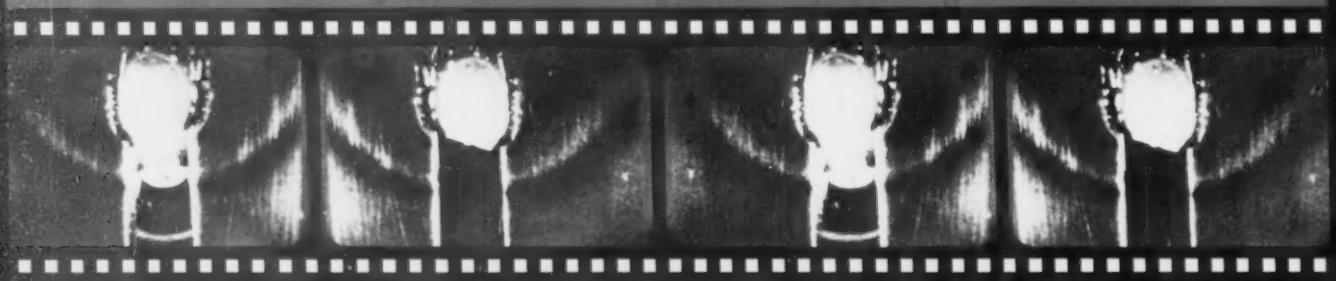
QUALITY SHEET-METAL WELDING

Sheet-metal welding has been *possible*, but quality welds were difficult and time-consuming. Now, LINDE's new Short Arc process—combining specialized power source characteristics, shielding gas, and semi-automatic torches—easily delivers *quality* and economy

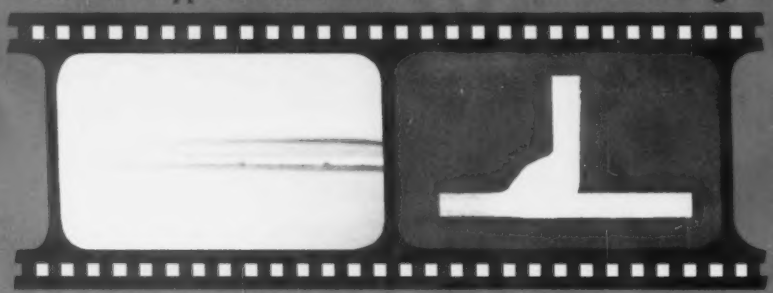
- **. . . on all sheet-metal thicknesses**
- **. . . with minimum distortion—far less than any other process**
- **. . . tolerating more than 100% gaps—even ¼-in. gaps on ⅛-in. material**
- **. . . producing 30 ft. of fillet welds for only a pound of wire and four cubic feet of gas**
- **. . . as fast as 20 inches per minute on 16-ga. sheet**
- **. . . as easy to control as a ball point pen**
- **. . . permitting all-position welding with the same settings**
- **. . . and *consistently* cleaner, smoother, more-uniform welds than any other process.**

See the next page for details.

SHORT ARC



Here is a typical LINDE Short Arc weld in the making...



a finished bead, and a weld cross-section...

Notice the intermittent "shorting," the smooth, finished bead, the uniform penetration. No spatter. No clean-up. No finishing. Welders trained in minutes. Short Arc employs precisely controlled, low-voltage pinpoint-arcs shielded by an argon-CO_2 gas mixture. Shorting the arc lets the puddle cool, *minimizing* heat distortion and *controlling* burn-through for ideal penetration. Short Arc works on all common metals and their alloys, on carbon steel, stainless, aluminum and magnesium...on all types of joints...in all positions.

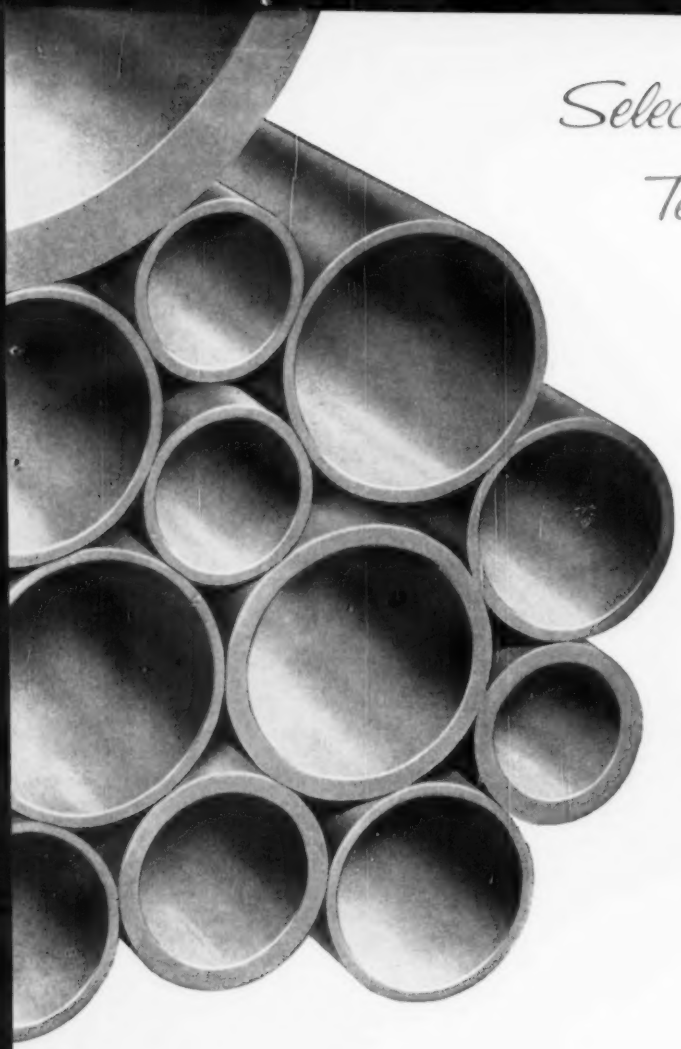
Only LINDE has brought together the ideal combination of materials for welding sheet metal—the SVI-300 power supply, with variable slope, voltage and inductance controls that permit an *infinite* range of settings; the C-25 argon-CO_2 gas mixture that combines with variable slope to reduce heat and *control* penetration; and the ST-2 and ST-4 torches, specially designed for hard and soft wires respectively. There is no substitute for Short Arc. Only LINDE offers the specialized equipment that makes such *quality* sheet-metal welding possible. For more information or a live demonstration, call your nearest LINDE office.

"Linde" and "Union Carbide" are registered trade marks of Union Carbide Corporation

LINDE COMPANY

UNION CARBIDE

Division of Union Carbide Corporation
270 Park Avenue, New York 17, N.Y.



Selection of finest raw materials

Testing every step of the way

Inspection to rigid standards

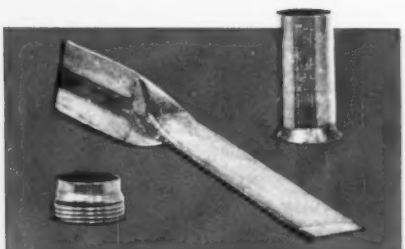
Assure 100% dependability for

OHIO WELDED PRESSURE TUBING

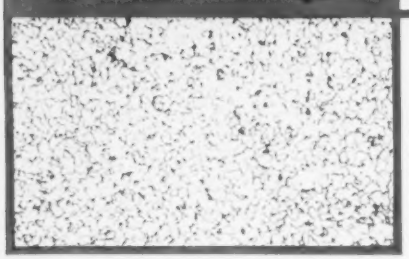
You can be sure — doubly sure — of utmost tubing dependability when you specify Ohio Welded Pressure Tubing — *made by Ohio Seamless.* First, Ohio works to accepted industry standards — ASTM, ASME, and similar Federal and military specifications covering welded pressure tubing. Second, Ohio Welded Pressure Tubing is produced under a *continuous* process of quality control — not just a final test inspection to cull questionable material.

Carefully selected prime raw material is slit, edged, shaped and electric resistance welded on the most versatile and modern equipment in operation. At each and every step of the way Ohio Welded Pressure Tubing is under the scrutiny of Ohio's master tubemakers . . . making control tests at frequent intervals . . . testing random samples from each production order far beyond the limits of the usage involved.

For critical pressure piping applications . . . for condensers, heat exchangers, boilers and superheaters — in the range of sizes from ½ to 7½" OD and wall thicknesses from .028 to .375"— mark your prints "*Ohio Custom Made Welded Pressure Tubing.*" There is no equivalent.



Photographs show flare, flattening and crush tests performed continuously on every order. Non-destructive tests include air, water, magnetic, eddy current and visual inspection to insure 100% dependability.



Photomicrograph of polished and acid-etched surface shows perfect microstructure of normalized Ohio Welded Pressure Tubing. Weld area running down the center is now indistinguishable and tube has become, in every sense, weldless.

OHIO

OHIO SEAMLESS TUBE

Division of Copperweld Steel Company

SHELBY • OHIO

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

Representatives in principal cities. Check leading directories:
THOMAS', MacRAE'S, CONOVER-MAST, SWEET'S, FRASER'S.

A-4800A

NEW "DIAL TORK" Nutrunner. The only power tool you can "dial in" for the precise torque you want. Ideal for the type of assembly or service work where a variety of fasteners must be tightened to different torque settings—with hand torque accuracy.

"One-Shot" Air Screwdrivers with offset or lever handles; reversible or non-reversible; silent exhausts. Torque range: 7 to 100 in.-lbs.

✻ **The secret of CP "One-Shot" Fastener Driving Tools lies in the precise torque sensing ability of the tools themselves. Put the tool on the work—press the throttle—the instant precise torque is attained *all* driving action stops. Its torque-awareness is unequalled by *any* clutch for *accuracy* and *consistency*. So don't just specify "torque control"... be *sure* you specify CP "One-Shot."**

CP "One-Shot" Screwdrivers can save up to 75% in fastener driving time... eliminate stripped threads.

Chicago Pneumatic

PNEUMATIC TOOLS • ELECTRIC TOOLS • AIR COMPRESSORS • DIESEL ENGINES • HYDRAULIC TOOLS • AVIATION ACCESSORIES

"One-Shot" Electric Screwdrivers with lever or offset handles. Torque range: 7 to 100 in.-lbs.

"One-Shot" Angle Nutrunners are jolt-free... easy to hold! Fasteners installed accurately to torque specifications. Range: ½ to 200 ft.-lbs.

CP-200 Torque Analyzer provides fast, simple method for checking clutch settings and stall torques of portable tools. Maximum capacity: 200 in.-lbs.

If your responsibility is threaded fastener driving...

DON'T JUST SPECIFY "TORQUE CONTROL" ...SPECIFY CP "ONE-SHOT"* FOR THE ULTIMATE IN TORQUE ACCURACY, CONSISTENCY!

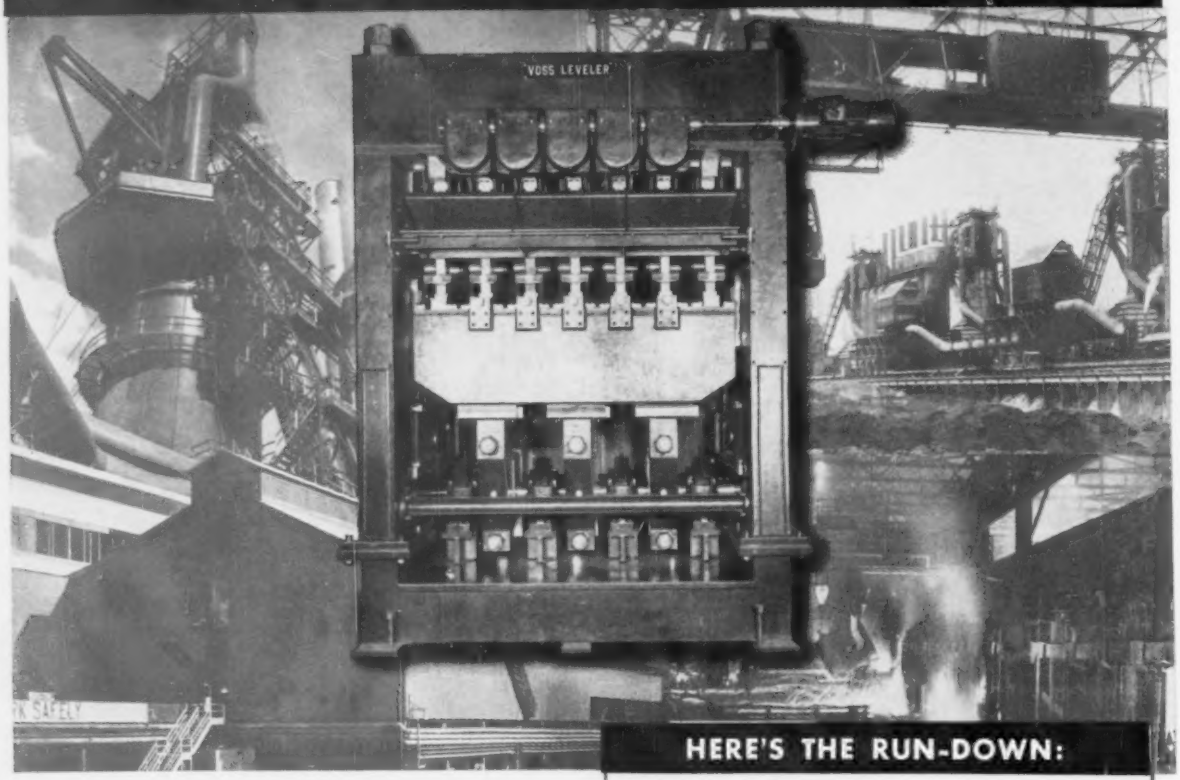
Since the first CP "One-Shot" torque control power screwdriver was introduced in 1954, industry has come to realize the *real plus values* of the consistent accuracy these tools maintain. They have proved their money-saving advantages because:

1. They cut spoilage and rejects to a minimum.
2. "One-shot" principle reduces clutch wear to the minimum... torque settings remain constant indefinitely... but are readily adjustable over a wide range when job specifications demand it.
3. They make training of operators easier and faster... simplify changes in work assignments.

CP manufactures the most extensive line of "one-shot" tools available today. Let a CP Torque Control Specialist help you solve your fastener driving problems. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N.Y.*

"One-Shot" Nutrunners hold their settings... simplify training of operators.

8 NEW VOSS LEVELERS AT U. S. STEEL!



VOSS VERSATILITY DEMONSTRATED IN LEVELER APPLICATIONS AT U. S. STEEL

The United States Steel Corporation has been using Voss Levelers for many years. During the past 2 years, U. S. Steel has again shown its confidence in Voss by ordering *eight new levelers* for installation in various plants. The applications are varied, ranging from galvanized and cold-rolled to plate and high-yield missile stock. Exclusive patented Voss principles enable *all* users to get better than stretcher-level flatness under most conditions, and at high production speeds . . . results unobtainable with any other leveler.

Voss Inverted Roller Levelers are designed for ferrous and non-ferrous metals in a wide variety of applications. Let Voss put 30 years of leveling experience to work for you.

HERE'S THE RUN-DOWN:

INSTALLED:

GARY SHEET AND TIN MILL
Application: Tin Plate Installed: 1958

IRVIN WORKS
Application: Cold-rolled Shear Line Installed: 1959
Application: High-Speed Galvanizing Line Installed: 1960

VANDERGRIFT WORKS
Application: High-yield Missile & Stainless Steels
Min: .062 Max: .1875 Installed: 1960

ON ORDER:

GARY SHEET AND TIN MILL
Application: Hot and Cold-rolled Steel Plate
Min: .062 Max: .250, 75" width Installation: Late 1960

IRVIN WORKS
Application: Cold-rolled Shear Line Installation: Late 1960

COLUMBIA-GENEVA DIVISION
Application: Cold-rolled Shear Line Installation: Early 1961
Application: High-Speed Galvanizing Line Installation: 1961

Voss ENGINEERING CO.

7301 Penn Ave. Pittsburgh 8, Pa. Churchill 2-4422

CONSTRUCTION IS HEADING FOR A RECORD-BREAKING YEAR. This is what F. W. Dodge economists conclude in a mid-year analysis. The pattern for the first half is expected to continue through the rest of the year. This means most of the upward push will come from heavy engineering and non-residential building.

STAINLESS STEEL mufflers will find more widespread use in Ford Motor Co. cars in the coming year. Introduced on 1961 Thunderbirds, stainless products will appear this fall on Lincolns, Mercurys, and Fords with dual exhausts.

POSSIBILITY OF PRICE INCREASES may spark inventory rebuilding in September. This is the view of Dr. J. H. Hoagland, National Assn. of Purchasing Agents consultant. He notes, however, in the July survey of buyers, "no sharp rise in the number of companies reporting increased inventories."

SALES OF MAJOR APPLIANCES showed strong gains in June, latest month for complete figures. Here is the record for five leading electrical appliance types: Refrigerators, 353,000, 11 pct over June, 1960; freezers, 109,000, up 6.4 pct; ranges, 145,000, up 12.4 pct; dishwashers, 50,000, up 18 pct; food waste disposers, 75,000, up 17.4 pct.

A DEVELOPING MARKET in building is the "not-yet-complete house." The term, used by builders, includes shell houses. More than 60,000 units were built by 70 companies in 1960. Some of the companies reported sales gains of 30 to 40 pct while completed-house volume stood still. Home builders see a "substantial" market in 5 to 10 years.

COST PRESSURES ON RETAILERS are prompting a second look by manufacturers of consumer goods. Aid in control of retailer expenses is viewed by some as a better selling tool than big price markup offers. Net profits, before taxes, of U. S. retailers in the first quarter were a low .7 pct. Reason cited by retail accountants: "Inability to control expenses."

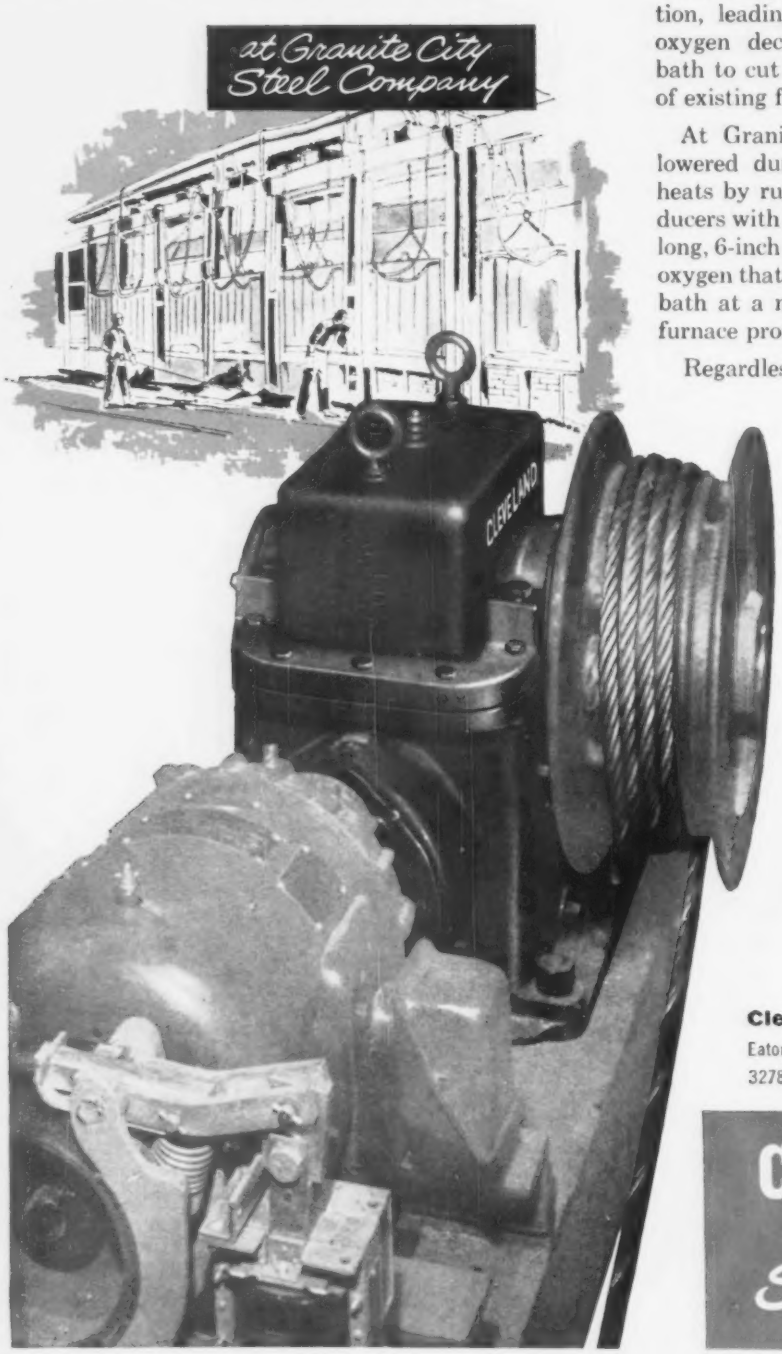
INDUSTRIAL SUPPLY AND MACHINERY manufacturers report receiving 3.6 pct more new orders in June than in May. This closes a rising order pattern for the first half where gains outstripped the Federal Reserve production index. Orders continue strong.

rugged, dependable

CLEVELAND WORM GEAR SPEED REDUCERS

manipulate lances used in high-production oxygen steel making process...

at Granite City Steel Company



With today's emphasis on increased production, leading steel producers are turning to oxygen decarburization of the open-hearth bath to cut heat working time—boost output of existing furnaces.

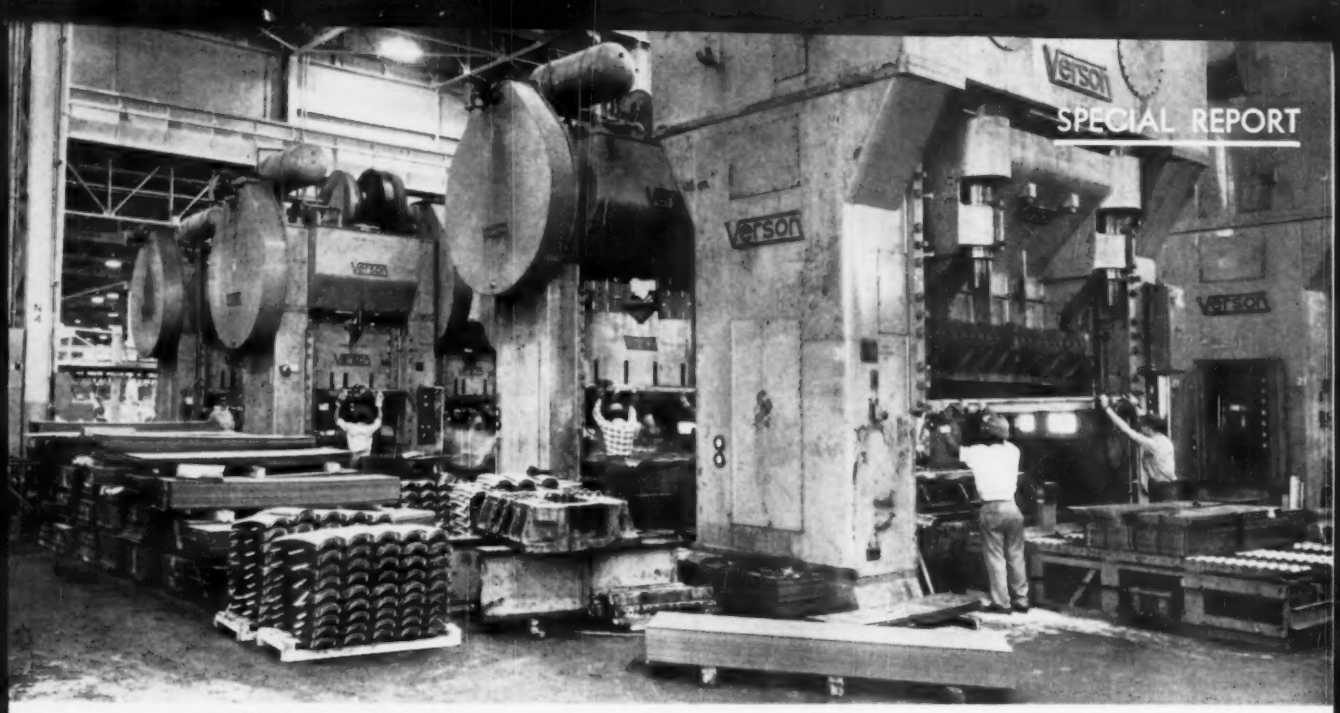
At Granite City, oxygen roof lances are lowered during the working of open-hearth heats by rugged 100AT Cleveland Speed Reducers with helical attachments. These 13-foot long, 6-inch diameter lances deliver high purity oxygen that reduces carbon content of the steel bath at a more rapid rate—greatly increases furnace production.

Regardless of shock or load, where motor power must be transmitted through a right-angle drive, smoothly, efficiently, and without interruption, Clevelands are the answer. Look around the next time you're in a steel plant and note how many of these versatile drives are in use.

Why not write today for your free copy of our most recent illustrated literature that shows the latest developments in the field of worm gearing. Or better yet, contact your nearest Cleveland representative and get the complete facts.

Cleveland Worm & Gear Division
Eaton Manufacturing Company
3278 East 80th Street • Cleveland 4, Ohio

CLEVELAND
Worm Gear
Speed Reducers



STEPPED-UP OPERATIONS: To fill increasing orders, stamping shops have expanded work schedules.

Stamping Sales Pick Up Speed; Strong 4th Quarter Expected

Following a slow first half, stampers are encouraged by a recent upsurge in business.

Improvement, which covers most major markets for stampings, could help industry top last year's dollar volume level.
By K. W. Bennett

▪ The stamping industry is coming out of the vacation season in a sales upswing that some plant owners call an "explosion."

"We're running 30 pct over April and June," says a stamper in the Midwest. "We didn't take our usual two-week plant shutdown this summer. Our orders with our steel suppliers are out as far as October. Right now we're in the process of moving October steel orders back into September. September tonnage has already been pushed up into August."

This stamper will probably beat his 1960 sales total by 16 pct this year. He's on a six-day week with overtime.

Eager Buyers—Another jobber comments, "The quotes are coming in hot and heavy. We used to quote a stamping job and then wait six months for an order. Now we get the order in 30 days. We're putting in overtime, but we're not hiring yet. However, if this order rate holds, we'll boost our work force by 15 pct starting in one more week. Our deliveries are at 6-7 weeks already."

A third points out, "We have boosted the workforce by 10 pct in the past two weeks and we're on two shifts. We're still hiring. The usual summer pattern didn't follow this year. We were off in May and June. But now we're at about full economic capacity."

Auto Stampers Optimistic—The upturn spread throughout the major markets for stampings, with the possible exception of automotive. But even here the prospects are promising.

A spokesman for The Budd Co., a large independent supplier of body components, tools, dies, and wheels, predicts: "We expect a very good last four months. The automakers are starting early on the new developments. In addition, the upturn should continue well into 1962."

He traces the pattern of the year so far this way: 1st quarter, slow; 2nd quarter, some pickup; and 3rd quarter, inactive.

Wide Range of Buyers—Stampers who are now running strongly report new business is coming from almost the entire customer list. The range includes manufacturers

of recreation equipment, power lawnmowers, appliances, and electronics equipment. The booming controls industry is another eager client.

In the Midwest, farm equipment and appliance makers have been excellent buyers. There's a wave of defense business shaping up in the aircraft, instrument, electronics, and heavy equipment industries.

It's worth noting that though light building hasn't been remarkably strong this year, some stampers, especially those on the East Coast, report a rising order volume from the building hardware field. A gain in construction buying would be a potent factor in giving strength to the current gains.

Machinery Promising—Still in the background, but hinted at strongly by trends developing in other fields, may be an upswing in machinery accounts. Increased buying from this quarter is noticed by a number of stampers, principally in the Midwest.

While not yet felt by the majority of the industry, some long inactive accounts in the machinery field have come to life. These customers are now buying and specifying immediate delivery.

The stamping industry sensed an upturn as early as April, when orders began to recover (IA, May 18, p. 111). With a strong second half shaping up, the majority of stampers polled think they will beat 1960 sales this year. That will mark the third year in which the industry has moved to higher ground from the low of 1958.

Optimistic, But—For the record, stamping men are speaking with careful optimism. But most admit second half business is strengthening at a good pace.

Comments W. M. Mill, president of Thomas Smith Co., Worcester, Mass., "We see the last four months as strong. Some orders have already been moved up. We've seen mild gains in new orders and gains in inquiries."

At Detroit, E. T. Nole, Advance Stamping Co., agrees, "I don't see the new order rate advancing more than seasonally. But the second half outlook, which should be much better than second half 1960, could boost our sales 10 pct this year. And that's despite the fact automotive buying is currently slow."

At Cleveland, G. C. Naples, handling purchasing and production control for S & Z Tool & Die Co., puts it, "Things look very good. The new order rate is running strong, though I'd hardly call it an explosion. I do think we'll get more pressure from customers before we'll see any slackening in demand."

Inventories Still Low — Present sales gains by stampers are not concentrated entirely in the Midwest, although they are more noticeable there. Improved ordering is reported by stampers in New England, the Mid-Atlantic states, and other areas. Not all stampers are experiencing the upturn. In the same area where sales are gaining, some shops are running 15 pct under last year. A quick check of stamper inventory stocks confirms they're running medium to low, with as little as two weeks steel in many shops, and an absolute top of 45-days inventory. A handful, however, admit they're in the first stages of an inventory buildup calculated to buy steel while it's still cheap and delivery is easy.

Inventory rebuilding will gain strength in September, insiders say, despite the public comments that no action will be taken until November.

Most buying forecasts call for a steady gain in raw materials buying, both ferrous and nonferrous, from August until the end of the year. The August-early September purchases will be used as fast as they are received. From then on, an increasing tonnage will be diverted to inventory.

The handful of shops which have already boosted steel inventory point out this increase lifts their in-plant stocks by no more than a two-week to six-week operating total. But in most stamping shops that's a 50 pct gain.

Pneumatic System Speeds Reaction

Pneumatic handling may be one answer to the logistical problem of steel mill openhearth operations.

The mills have found ways to speed steelmaking reactions through injections of fuel and oxygen. To take full advantage of these techniques, they must get materials in and out of furnaces in less time.

Systems of pneumatic handling and injection are being tried as one answer to this difficulty.

Low Heat Times—In experimental projects, ore, limestone and oxygen are all being fed to openhearths through overhead lances. No details have been released. But heat times as low as four hours are said to have been obtained with large furnaces.

Blaw-Knox Co., Pittsburgh, recently demonstrated a complete pneumatic system for handling dolomite, as well as lime and ore. For rebuilding furnace walls after a heat, Blaw-Knox has mounted a mechanical dolomite thrower. It is on a monorail that runs around the front of the openhearth.

Side Loading—The self powered throwing unit is loaded from a pneumatic outlet at the side of the furnace. It then travels on the monorail to the throwing position in front of a furnace door.

System details can be varied according to space requirements of particular shops.

The company says shop congestion is relieved and hot metal cranes are freed for other work by the new dolomite unit.

Direct Move — According to Blaw-Knox officials, the pneumatic feed system can also be used to deliver ore and lime through lances under pressure directly into the bath.

In the particular design shown, low pressure blowers moved material through steep piping under the charging floor, and then vertically to cyclone receivers.

In addition to faster handling, overhead injection permits the use of ore and limestone fines.

Auto Imports Find Rough Going

Shakeout May Not Be Over as '61 Sales Lag

Back in April, foreign automakers counted on bigger shares of the U. S. market.

At mid-year, goals are lowered. The question: Is shakeout over for foreign cars?

■ With a few notable exceptions, foreign automakers are not meeting their goal in U. S. markets this year.

Last April at the International Auto Show (IA-April 13, '61), predictions of fatter U. S. sales were the rule. For example, Renault took aim at 15 pct of imports to the U. S. this year. Now, 12 pct is the best the company hopes for.

Strikes Hurt — British Motor Corp. was optimistic in April, offering alibis in August. But BMC blames its showing on a strike of instrument makers at the critical introduction time.

"We had orders, but not the cars," a BMC spokesman says. "And once you lose a sale, it's gone."

But BMC says its problems have been solved, and predicts it will sell 40,000 sports cars in the U. S. in the next 12 months. The company is doubling output of one of its best U. S. sellers, the Sunbeam Alpine, with almost all of the increase aimed for U. S. shores.

VW on Schedule—The prime exception is Volkswagen. Back in April, C. H. Hahn, general manager of Volkswagen of America, Inc., predicted sales of 200,000 here this year. In the first six months, VW registrations reached 100,672, putting the goal within easy reach.

The managing director of Rootes Motors, Inc., J. T. Panks, calls sales for the first six months "normal and as expected." But his idea of "normal" is well below the record period of 1958-59 when import sales topped a half-million.

What's Normal — "A market of about 400,000 units a year—give or take a few thousand depending on economic conditions—is the true norm," Mr. Panks says.

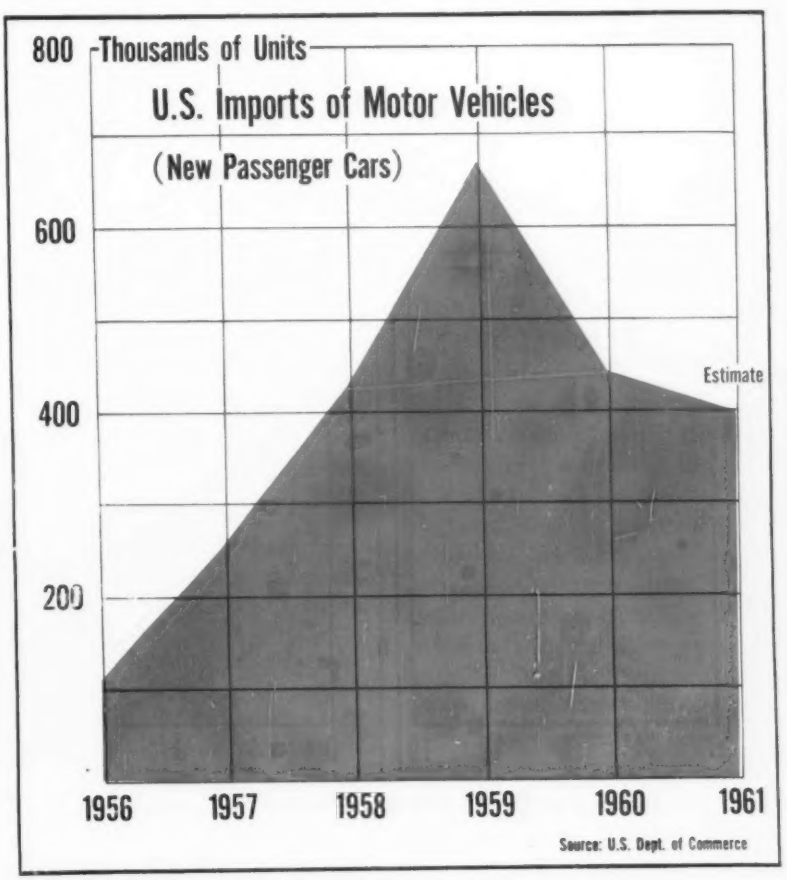
A Renault spokesman, H. B. de-Balan, general sales and service manager, points out that, even though his company will fall short of its target, "the fact that we have steadily increased our sales each month since the first of the year (exception, April) gives us a great amount of confidence."

Shakeout Over? — Many of the foreign automakers say the shakeout of the market for foreign cars in the U. S. is far from over. Volkswagen's Mr. Hahn says companies that can hold their own in the face of strong domestic competition this year should maintain a satisfactory share of the market in the years ahead.

One example of this: Austin-Morris 850. BMC says sales of this small, economy car are not as good as had been hoped for but not as bad as feared. The 850 now appears to be hitting a level somewhere in between.

VW, as part of its drive to stay on top of the imports has souped up its dealer organization by 7.5 pct during the first half of 1961.

Is Import Market Leveling Off?



Steels Graded on Performance

SAE Specifies H-Bands on Two Carbon Steels

SAE proposal of H-bands for 1041 and 1045 steels may be the start of a trend in industry.

Steel users place more emphasis on what a specific grade of steel will do, less on composition. By G. J. McManus.

■ A new approach to quality may be bringing a shift in responsibility for steel mills and their customers.

The new viewpoint emphasizes properties and performance of steels rather than composition and processing. Users are telling the mills what a steel must do. To some extent, they are getting away from the question of how results are achieved.

SAE Proposal — This thinking shows up in a recommended practice, prepared by the Society of Automotive Engineers, for two grades of carbon steel. SAE's proposal makes the mills responsible for providing a certain range of hardenability in 1041 and 1045 steels. At the same time, it could give producers greater leeway in the chemical makeup of these grades.

The program of upgrading automotive stainless has worked in a somewhat similar manner. Auto plants applied tough corrosion tests. The auto people left it to producers to make up the process changes and allow additions to meet the tests.

Stainless mills reacted by installing bright annealing and buffing lines. Starting with the standard 430, they added molybdenum and copper for corrosion resistance. A columbium variation was offered for severe forming applications. Columbium and molybdenum were combined in another alloy. As it stands so far, stainless producers have added four new grades or variations for automotive trim.

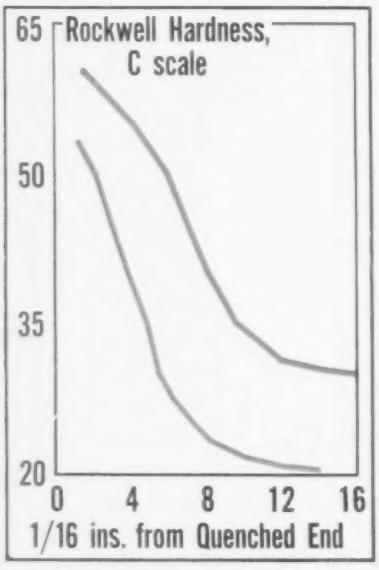
No Increase in Price — Auto plants are now nailing down these changes in specifications. However, prices still reflect the starting premise that performance is the main concern of the user. No premiums are being charged for bright-annealing, buffing or special alloy additions. The general weakness of stainless prices is a factor in this arrangement but it also seems clear the mills have taken a step beyond straight metals production and towards metals application.

Hardenability Bands — On the matter of hardenability bands for carbon steel, implications are less clear. The new practice calls for the mills to apply a standard hardenability test to 1041 and 1045 steels going into bars, seamless tubes, wire rods, and semifinished forging stock. (See chart.) Results must fall within a certain band to be acceptable.

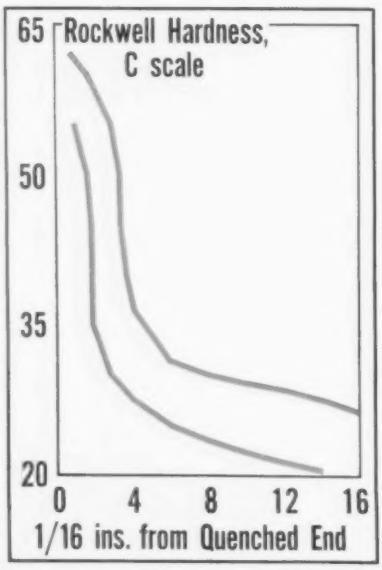
This kind of practice has long been used for alloy steels. In selling alloys, the mills have promoted the idea that prices should be considered in terms of units of strength rather than units of weight. Producers have taken the initiative in showing how savings could be obtained.

Mills Meet Demand—A few customers have had their own hardenability specifications for carbon steel but there was never a general standard. There has reportedly been user pressure for such a standard for some time, but only recently have the mills indicated they would go along with demands. Bands for two grades were approved in June. Work is now underway on four more.

It is not expected the new approach will enable heat treaters to go from alloy steels to carbon steels. The customer still gets only a relatively shallow hardening with the latter. However, the assurance of uniform hardening could be important to plants that are now heat-treating carbon steels on a mass basis. In these situations, equipment can be geared to a uniform response, regardless of steel source.



Hardenability Band 1041 H



Hardenability Band 1045 H

It is not known how many heat treaters are looking for this type of predictability. One mill knew of no orders that had been produced to the new specification. Another had one inquiry from an auto plant but had not received an order.

How Big a Problem—If there is a demand, the mills indicate they will meet it. One sales executive anticipated no great problems. He pointed out steel is already being produced to closer chemistry ranges than the new practice requires.

Others were more cautious. A technical man explained that carbon steels do not have the flexibility of alloys; there are fewer variables and there is a smaller range of variation. Relying mostly on manganese to regulate hardenability, he felt, it might be difficult to meet standards without overgrading.

The other problem mentioned was that of residual elements. Where furnaces are used for both carbon and alloy steels, there could be effects from chrome, nickel and other elements.

It may be some time before all the difficulties and benefits balance out. However, the general trend seems to be toward closer ties between steel production and steel products.

Youngstown Unveils 60-In. Galvanized

Youngstown Sheet & Tube Co. last week unveiled a 60-in. hot dip galvanizing line at the Indiana Harbor Works, East Chicago, Ind.

The new mill has been laid out for possible 100,000-ton galvanized sheet output. It now can turn out 10-30 gage zinc-coated strip at 400 fpm in widths ranging from 20 to 60 in.

The line is part of Youngstown's capital improvement program. Other Indiana Harbor projects include a six-stand cold reduction mill and continuous annealing line.

With its "Tufkote" product, Youngstown is re-entering the galvanized steel market. The new line is aimed at the expanding automotive market for galvanized.

Tinplate Undergoes Another Squeeze

▪ Skinny tinplate shed a layer of skin this week, with price implications that could be far reaching.

Specifically, United States Steel Corp. came out with a lighter coating for Ferrolite, the name it applies to thin tinplate.

The new product has a coating of .10 lb per base box. It is priced 15¢ a base box under Ferrolite with its .25 lb coating (This has been the standard weight.)

For Oil and Citrus—Oil and citrus cans are the two immediate applications for thin tinplate with the light coating. U. S. Steel emphasizes other markets could be developed in the future. However, the oil and citrus fields have yielded the biggest gains for aluminum and have produced the sharpest price action.

It is not yet clear how this latest tinplate move fits into the citrus picture. A little more than a month ago, can makers put through a hefty reduction in prices of thin tinplate juice containers. Aluminum producers came back with a slash of about 2¢ a pound for the citrus cans stock. The container people then dropped their prices for aluminum cans.

What's Next?—The new tinplate price could be the windup of this round. According to one source, the can companies squeezed themselves hard with their last reduction in prices of thin tinplate cans. If there are no further changes, the lightweight coatings would help restore margins.

On the other hand, new schedules could mean the start of another pricing go-round. Can makers have watched the in-plant programs of Reynolds Metals Co. take over a portion of the citrus market. They know Aluminum Co. of America has been working in the citrus belt with equipment for making laminated foil cans.

Back to Aluminum—With strong competition, the can companies may elect to pass along savings afforded by lighter tinplate coatings. If this happens and prices of tinplate cans are again reduced, aluminum producers will find themselves in a tight corner. Aluminum stock for cans now costs only 2¢ a pound more than primary aluminum.

Tinplate Economics—Steel mills say no new price policies are involved in the overall thin tinplate program or in the new coating weight. U. S. Steel says the reduction of 15¢ a base box is simply a matter of using less tin. Double-reduced plate costs less because less steel goes into a base box, say tinplate men.

However, some feel thin tinplate prices have represented anticipated costs rather than current costs in many situations. Using temporary facilities for the second rolling and putting coils back through electrolytic lines for cleaning, it is a question whether material savings have offset price differentials.

Steps Taken—This picture will change as the mills put in facilities specially designed for thin tinplate. National Steel Corp. was the first to announce such an installation. Last week, Jones & Laughlin Steel Corp. revealed it is going ahead with a special, thin-tinplate mill. J&L is spending $12 million altogether in a capital spending program for thin tinplate facilities. Others are expected to follow.

Aluminum people say their own cost pictures will also change with increased volume, new rolling techniques, and more continuous overall operations.

Metals Regroup for Battle In Architectural Field

Metals are getting stiff competition from concrete in the architectural field.

Last week metal building product representatives met in Chicago to plan a counterattack. By F. J. Starin

■ Last week, the men who push architectural metal products got together in Chicago.

But the purpose of the meeting (sponsored by the National Assn. of Architectural Metal Manufacturers) wasn't to add up gains made this year in the building field.

Instead, they met to marshal forces and map out a program to combat recent gains made by more conventional building materials in the construction field.

Building Competition—Metals—enameled steel, aluminum, stainless steel, and other curtain-wall materials—are getting a run for their money. Setting the stepped-up pace are such old timers as bricks and concrete.

And spurring the materials contestants on are the architects.

"If I had an office building to do now of not more than 25 stories, I would probably do it in reinforced concrete," says one architect.

"When I get a project to design a building, metal is about the third material I think about," says another.

The Disenchanted — Comments such as these are not taken lightly by the metal products people. The statements were made by architects who have contributed some of the leading examples of buildings using metal curtain walls.

The first came from Gordon Bunshaft, partner in the firm of Skidmore, Owings & Merrill. And to him goes credit for New York's Lever House, one of the first big boosts for metal curtain wall. More recently, he did the Union Carbide skyscraper in stainless steel.

The second note of discontent came from Arvin B. Shaw III, another leading architect and partner in the firm of Carson, Lundin & Shaw. Mr. Shaw designed 666 Fifth Ave. in New York, a leading example of aluminum curtain wall.

Played By Ear—These are not isolated rumblings of discontent. Others share their view. Criticism being heard more frequently: Monotonous; little freedom of design; too common.

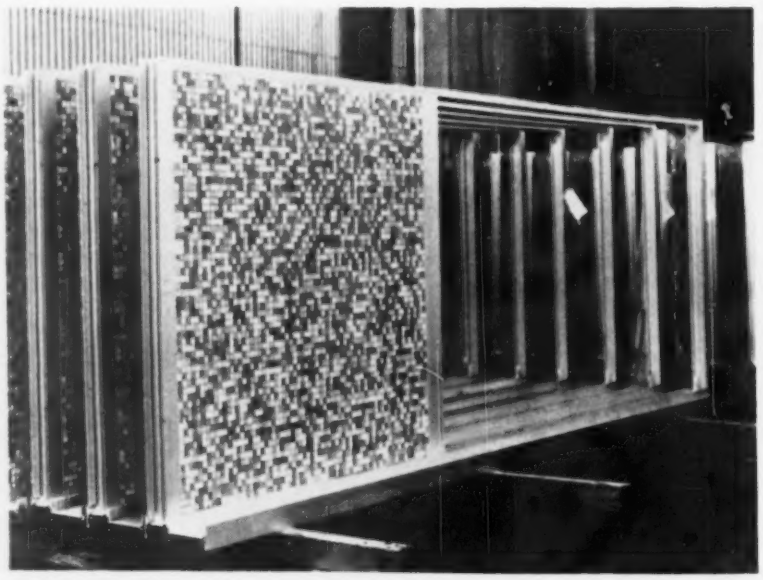
Complains Mr. Bunshaft: "I did the Lever House by ear. Then industry got hold of it (metal curtain walls) and made a mass production product. Now, there is a rash of very ordinary buildings with metal skins. When the manufacturers took over metal skin construction they killed it."

Wrong Tune—Why this attitude? Mr. Shaw offers an explanation. He says a major aluminum company convinced one of his clients to use aluminum skins, and even footed part of the bill. But, when the architect tried to get information needed to work out the panels, the aluminum company was unprepared technically to back up its sales job.

Experiences such as this have convinced some architects that architectural metal products are underdeveloped and oversold. Consequently, they are turning to other materials.

The Ultimate Form — The new favorite seems to be precast concrete. One architect, Burton Holmes, explains, "With precast and cast-in-place concrete, the designer is in complete control of the ultimate form. And he is free of any compromise that might be traced to a manufacturing process."

In addition to almost limitless



COMBINATION WALL: The First National Bank of Oregon, Portland, has curtain walls of aluminum sash with mosaic glass sections set into them.

shapes and patterns possible, finishes are available ranging from highly polished and reflective to rough. And the material can be colored.

Background Music — And the fostering of these attitudes is getting a strong assist from the Portland Cement Assn. It is backing research aimed at developing dense, water-resistant panels; stiffening standards; compiling comparative cost data; and promoting aggressively.

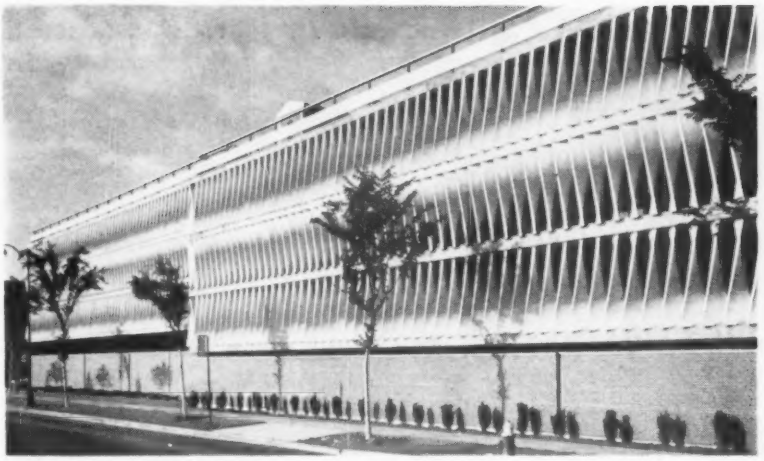
However, the battle is not all one-sided. Robert Jacobs, of Kahn & Jacobs, which was associated with the bronze-skinned Seagram's Building, says the architect today is something like the designer of women's hats: They are expected to come up with new models continually.

He sees nothing wrong with the trend toward standardization in metal panels. He points out that bricks are a standard material and that architects have been working with them for years.

A Few Suggestions—But he has some suggestions for the metals industry. He would like to see more basic research by materials producers and fabricators.

Actually, there is no shortage of suggestions for the metals industry. Richard Roth, of Emery Roth & Co., would like a better selection of colors, better color matches, and improved durability.

T. H. Creighton, a Fellow in the American Institute of Architects, suggests a four-point approach by the architectural metal products industry: Coordinate the metal industries to a greater degree; improve standards; promote more aggressively; and maintain "useful contact" with architects.



PRECAST CONCRETE: Striking concrete sculptural grille encases five-story, split-level parking garage at the Henry Ford Hospital in Detroit.

Taking Advice—That the architectural metals producers intend to heed some of this advice is evident. Last week's meeting in Chicago was attended by 10 trade associations representing at least 550 companies in the metal building products field.

Said E. A. Kister, manager of architectural sales and development for Allegheny Ludlum Steel Corp., "In a record building period, the building business climate suggests more the tough times of the '30's."

Suggested Max Schoetz, manager of building product materials for Aluminum Co. of America, "Small specialized trade groups can't accomplish everything to be done."

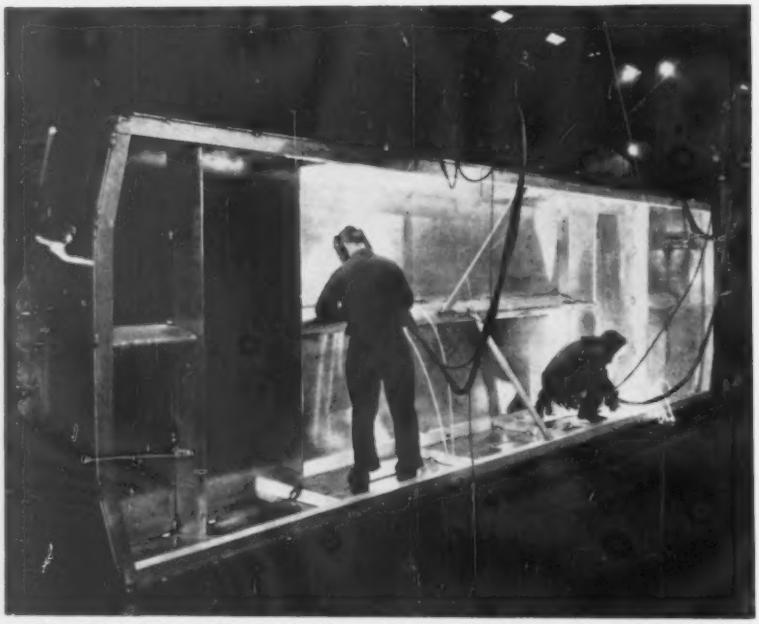
Unified Effort—The consensus among representatives from metals industries, fabricators, and trade associations: The metal building industry needs a unified promotion program and a quality-policing program.

The first step: Another meeting in Chicago at the end of this month. It will be headed by temporary president J. M. Roehn, vice president of research and development for Kawneer Co., and president of the National Assn. of Architectural Metal Manufacturers.

The Council of Architectural Metal Trade Assns. will then review suggestions made at last week's meeting in an effort to decide what can be done to create a unified industry front.

METAL CURTAIN WALL: The Nassau County Courthouse at Mineola, N. Y., has framing of aluminum extrusions, and porcelain enameled panels.

Aluminum Coal Cars Move Towards Mines



INTO PRODUCTION: Irwin-Sensenich Corp., Irwin, Pa., is fabricating 125 aluminum mine cars from Aluminum Co. of America plate, extrusions and castings. The light metal coal carriers were experimental units.

U. S. Tool Builder Joins W. German

An international expansion move has linked tool building companies in the U. S. and West Germany.

Ingersoll Milling Machine Co., Rockford, Ill., has signed an agreement with H. A. Waldrich GmbH, of Siegen, Westfalen, Germany. The companies will exchange designs and technical know-how.

Ingersoll will build Waldrich heavy duty lathes and roll grinding machines for the U.S. market. Waldrich will build Ingersoll special machines for Europe.

UAW: A Warning From Autolite

Electric Autolite Co. has issued a warning to the UAW over a dispute on incentive pay at its Bay City, Mich., plant.

Company management said the future of the plant hinged on acceptance of a supplemental agreement which the union turned down last week.

The agreement involves time study of all incentive jobs and establishment of a standard hour incentive system.

An official of Local 526 said membership voted against the plan and asked for a strike vote if it goes into effect.

The union originally accepted the agreement last autumn, but says acceptance was based on Autolite's promise to open 700 to 800 new jobs. Instead, according to the union, 250 jobs were deleted.

British Pay Threat

The British Employers' Confederation has warned the trade unions that if Britain enters the European Common Market, pay raises will be "out of the question" unless productivity also increases.

Once in the Common Market, British companies will be in direct competition at home and on the Continent with overseas companies —and also in direct competition in regard to employment costs.

Employers contend that unless wage increases are matched by higher productivity, the result would be "simply handing over markets to the foreigner."

World Steel Output Drops From '60 High

World steel output in the first half of this year totaled 182 million tons. It was a 4 pct drop from the record 1960 production high of 189 million tons.

Dept. of Commerce reports a large 26 pct decline in the U.S., from 60.7 million tons in 1960 to 44.8 million tons in 1961.

Outside the U.S., total output was up 7 pct. Japan advanced 3 million tons in the first half to 14.5 million tons. It moved ahead of the United Kingdom for the first time to take over fourth place.

Mitsubishi Signs Kaiser Ore Pact

Kaiser Steel Corp. has signed a 10-year contract with Mitsubishi Shoji Kaisha Ltd. of Japan. It covers 10 million long tons of iron ore. Kaiser will begin shipping 1 million tons per year in 1962.

The ore will be produced at Kaiser's Eagle Mountain Mine in Riverside County, southern California. It will be carried in 50,000-ton ore boats being built in Japan.

New High Sighted For Construction

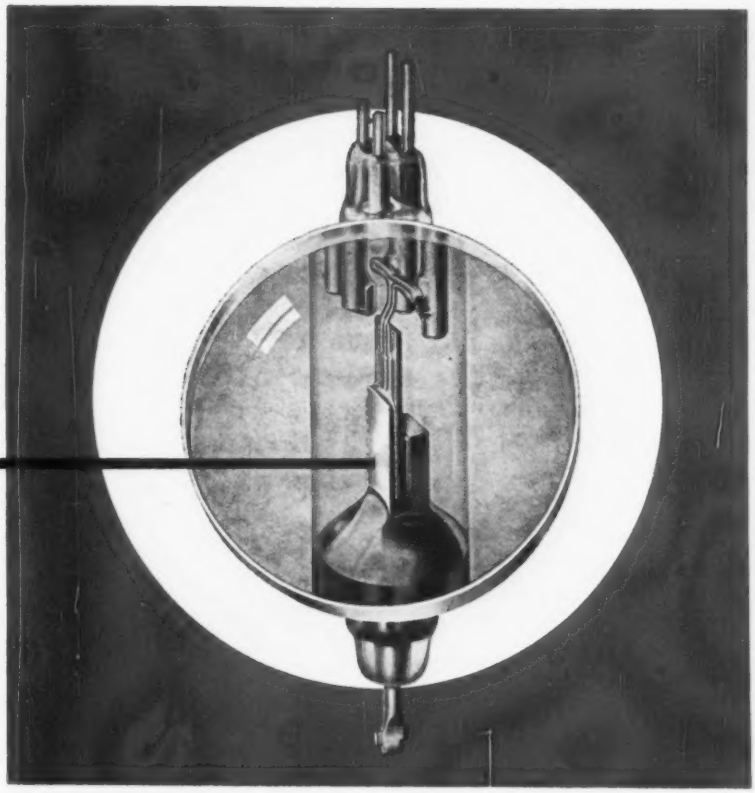
It looks like the construction industry will be able to call 1961 a boom year. Building of all types —homes, apartments, stores, offices—is expected to hit a new peak.

Total construction spending this year is now expected by government housing experts to reach $57.8 billion, up 4 pct from last year. Government experts expect home building itself to gain about 4 pct over last year, with 1.32 million new houses.

Home builders anticipate an increase in volume of 5 pct in 1961 over 1960. Other construction economists are not quite as optimistic. But they forecast at least a 2 pct housing jump this year.

BILLIONS OF BENDS

Prove SANDVIK SPRING STEEL'S *Fatigue Resistance*



Here is another example of the extraordinary fatigue life you can get from Sandvik Spring Steel.

C. P. CLARE & CO. uses Sandvik 12W12C1 Steel as the spring support for the armature assembly in their line of Mercury-Wetted Contact Relays. Here, from a letter by Mr. C. H. Smith is what they say about it.

"The steel piece deflects through a complete cycle – once for each operation of the relay. Sandvik Steel was chosen for its excellent fatigue resistance. When you realize Clare HG relays have a life expectancy measured in billions of operations you can see the importance we place on selecting top grade materials."

The steel used for this application is only one of Sandvik's many types of specialty spring steels. Each type provides consistent, predictable results for a specific range of application.

For more information on Sandvik Specialty Steels and how they can be applied advantageously, use the coupon below or send us a note on your letterhead.

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INDUSTRIAL BRIEFS

Automated Mill — Shapeweld Div., Solar Steel Corp., is installing an automated tube mill at the Union, N. J., plant. It will have a capacity of over 2 million ft of welded tubing per month.

Growth Plan—Kaydon Engineering Corp., Muskegon, Mich., is spending over $1 million for plant improvement this year. It includes a 15,000 sq ft plant addition and rearranging of departments to improve work flow and material handling.

Double Annealing—Seaway Steel Div., Roblin-Seaway Industries, Inc., North Tonawanda, N. Y., has doubled its annealing capacity. It has acquired furnaces for normalizing and spheroidizing cold heading quality wire rod in coils.

More Wheels—American Brake Shoe Co. has completed a $1 million expansion program at the Calera, Ala., plant. It increases railroad wheel production capacity from 460 to 540 wheels on two eight-hour shifts.

Three-in-One — Woodward Iron Co., Birmingham, Ala., is acquiring most of the assets of Lynchburg Foundry Co., Lynchburg, Va., and National Cement Co., Birmingham.

20 Pct Bigger — Sawbrook Steel Castings Co., Cincinnati, has begun a $600,000 plant addition. The supplier of carbon steel and low alloy castings is adding 20 pct to existing facilities.

Military Move — Military Products Group, Minneapolis-Honeywell Regulator Co., has moved its procurement department to a new facility at St. Petersburg, Fla.

Tank Buildup—Nooter Corp., St. Louis, has started a $1 million expansion program geared to nuclear age growth. The fabricator and erector of tanks and pressure vessels is adding shop area and equipment.

Continued Growth — Reynolds Metals Co. has begun the second expansion at the Bellwood, Va., aluminum foil printing plant since it was opened three years ago. The program includes a new $400,000 building and additional presses to increase capacity by 50 pct.

Rolling Ahead—Olin Mathieson Chemical Corp. has started a multimillion-dollar expansion program at the Omal, O., aluminum rolling mill. New facilities will include a 66-in. cold-rolling mill for bright-finished sheet.

Two-for-One—Master Electric Div., Reliance Electric & Engineering Co., Dayton, O., is moving operations to two new plants in Indiana. Scheduled for completion this fall are a 210,000 sq ft building in Columbus, Ind., and a 160,000 sq ft building at Madison. Master Electric produces fractional horsepower motors and gear-motors.

Double-the-Room—Dynel, Inc., has doubled facilities by moving into a new building at Los Angeles. Dynel specializes in the development and manufacture of pulse code telemetry and control systems.

Southern Sales—Universal Atlas Cement Div., U. S. Steel Corp., has set up a new sales office at Port Everglades, Fla. It follows acquisition from Ponce Products, Inc. of cement storage and distribution facilities at Port Everglades.

Joint Operations—Lincoln Electric Co., Cleveland, has built a combined office-warehouse at St. Louis. It will handle the sale and distribution of welding equipment and supplies in Missouri.

Going West—Photomation, Inc., Bergenfield, N. J., is moving executive, engineering and manufacturing facilities to a new plant at Mountain View, Calif. It will enlarge Photomation's electronics research and development facilities.

Bearing South—General Bearing Co., Inc., West Nyack, N. Y., has opened a new warehouse and office at Miami, Fla.

Better Quarters—Fairbanks Co. has moved its Boston branch office and warehouse to a new building at Cambridge, Mass. It will speed distribution of valves, trucks, casters and wheels.

Flying West — Data Systems Dept., Norden Div., United Aircraft Corp., has transferred its Hartford, Conn., office to Costa Mesa, Calif.

New Offices—Telecomputing Corp. has opened new corporate offices at Los Angeles. It has also set up an advanced controls systems and components engineering facility at Chatsworth, Calif.

Central Headquarters—Hancock Telecontrol Corp. has moved corporate offices from Jackson, Mich., to New York City. Sales offices of the automatic-input data collection, data display and communications system product will not be affected.

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7-FLEX can make important savings on many wire-rope applications. Ask any Macwhyte distributor. Free Bulletin 60100-R available upon request.

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Wanted: Creative Managers

Experts don't always agree on what talents managers will need most in the 60's.

But they are agreed on one fact: To be successful, managers must be more creative.

■ Opinions vary on the type of manager who will be most needed in the 1960's.

Business faces so many tough problems, the best manager could come from almost any line—or staff—function. Styles in management change to fit the times. If you review the past, you'll discover the financier was important in the 1920's. The depression - riddled 1930's put the stress on cost control and labor relations.

By the 1940's, the emphasis had swung to those who could get out the flow of war-needed goods. In the 1950's the spotlight was still on production management. But it also included personnel and sales management.

Many Paradoxes—After reviewing these trends, Harries-Clichy Peterson, a business consultant, notes in the Univ. of Indiana's Business Horizons, "What approaches will business adopt in the 1960's? We face major paradoxes on all fronts. We must compete against growing Communist economic and military power, yet maintain our living standards. We must aid uncommitted nations, yet guard our monetary reserves. We must boost exports against mounting foreign competition, yet increase wages. We must pay for new federal aid in health, welfare, and education, yet offer tax incentives to stimulate economic growth."

Too Static?—Whatever happens, management in the '60's is sure to emphasize cost control, research, technical advance and marketing.

Despite debate about what will be stressed many who study management development agree on one prime fact: The successful manager must be more creative. There is a growing belief that much of today's management is too inflexible, too static.

More Nonconformists—This, in turn, brings up the concept of the Organization Man, so popular in the 1950's. Although still popular, this approach is coming under increasing fire. However, it may never be thought of as harshly as John E. Conner, manager, Data Processing, Curtiss-Wright Corp., regards it:

"The corporation that does not number one or two nonconformists among its executives had best examine its conscience carefully. If there is no executive with a beard, or who is badly tailored, or refuses to sign non-Communist affidavits, or favors nonobjective painting, the corporation can wonder whether its organization allows effective use of all human resources. It is not true that the best financial strategists or management psychologists are those in well-shined shoes and with weekly haircuts and attaché cases."

What Are the Weak Spots?

■ Assuming some flaws in management selection, where is present development weak?

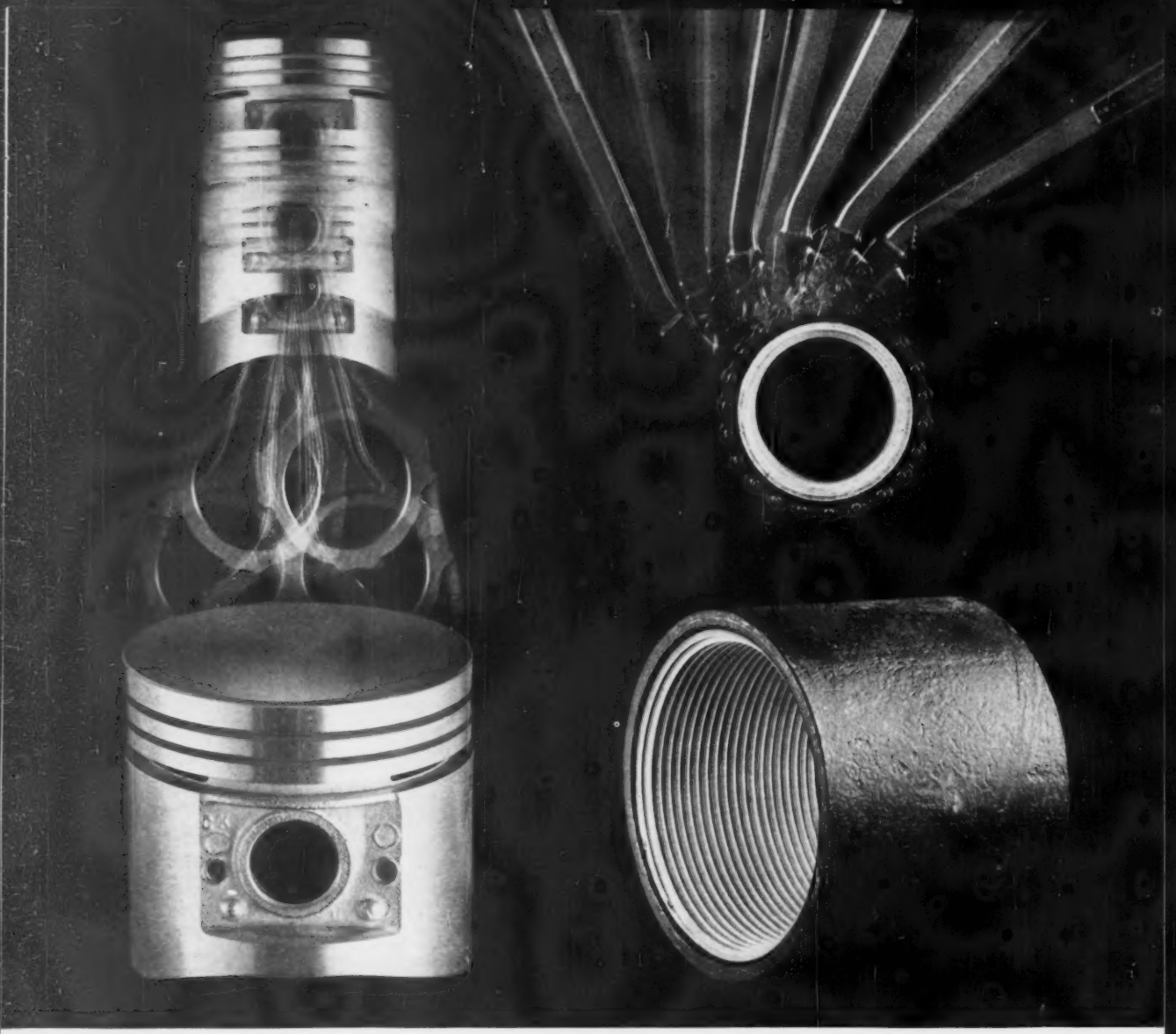
Reed Powell, associate professor of business administration, Univ. of California at Los Angeles, reports in Business Horizons on a series of case reports on management development.

In the survey, upper-level executives discussed why development programs must recognize the rapidly changing business environment and adapt to it.

Serious Charges — Educational programs are needed, they said, because company management can be: Resting on past reputation; immersed in its own dogma and unaware of changing needs; afraid of competition in the commercial field.

The executives also pointed out management must develop greater perception to exploit its opportunities. And it must develop strength and ingenuity from within to compete successfully.

Some Comments — Mr. Powell quotes several executives on the subject. One commented, "I doubt seriously that we have the management capability to compete in a competitive world." Another noted, "We have somehow got to stop being the big producer of the past and become the big competitor of the 1960's."



Valuable "lubricating" effects obtained with thin layer of tin

These two applications illustrate the physical advantage of a thin layer of tin. Both benefit from its low cost lubricating effect.

In the case of the piston, the soft tin is applied by an immersion process. It promotes wear-in without scoring. This lubricating effect guards against the engine break-in damage that was so costly years ago.

In the case of pipe couplings, tin electrodeposited on threads assures tightly sealed joints that do not seize or "freeze." It permits connection to be made or broken with less effort, minimizes high pressure leakage in pipe such as that used in oil country.

Perhaps these examples of the lubricating effects of tin suggest applications to your products. Substantial benefits may be obtained at very low cost.

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Deadline Set for Car Fumes

Automakers Must Install Air Pollution Guards by 1964

Automakers have been given a deadline to install air pollution control devices on cars.

HEW Secretary Ribicoff says they must be on the 1964 models or he will push for legislation. By A. E. Fleming

■ Automakers have a deadline: Air pollution control devices must be on all new cars by 1964.

The ultimatum came from Abraham Ribicoff, Secretary of Health, Education and Welfare. He made it at a meeting of auto industry officials and the Automobile Manufacturers Assn. last week.

To the surprise of many, he suggested if automakers don't comply voluntarily he will ask Congress for a law to make them do so.

Unusual Step—This is the strongest stand taken on air pollution by any government official.

Mr. Ribicoff's predecessor, Arthur Flemming, in early 1960, said that steps should be taken to install the devices on cars as soon as possible. But he didn't bring Congress into it.

Mr. Ribicoff's deadline seems to leave automakers with just two choices: They can wait for the government to act; or, they can put on controls voluntarily.

Avoid Fight—Probably the industry will choose the voluntary route. Neither it nor the AMA is eager to battle or incur the wrath of a Cabinet member.

The companies will put air pollution units on 1964 automobiles without legal intervention. But it won't be voluntary.

Through public relations and other channels they will let the government and public know that they are installing the units against their judgment.

They will shove the responsibility squarely on Mr. Ribicoff's shoulders, in case any problems arise.

Not Needed—The fact is, auto engineers and scientists have been studying the role of cars in air pollution for eight years. They don't think control devices are needed or will be useful in all areas of the country.

Mr. Ribicoff thinks they will be useful. He considers air pollution a serious problem that demands prompt attention. And he feels that it will grow worse unless the adverse effects of air pollution by cars is checked.

Smog State — Automakers say their investigations indicate California, with its celebrated brown mist, is the only state that really needs controls on cars.

The industry offered air control devices as optional equipment on all cars sold in California beginning with 1961 models. Called a blowby unit, it pipes crankcase fumes back through the intake manifold for reburning in the combustion process. Cost is about $5. Most are made by AC Spark Plug Div. of General Motors Corp.

If required on all cars, other manufacturers could be expected to leap into production. A multi-million dollar business would be created.

Auto News, Here and Abroad

Government Sale — Chevrolet Div. of GM has asked for early approval of its offer to buy a government-owned plant it has been leasing for transmission manufacture.

Chevrolet bid $1.4 million for the 130,000 sq ft plant in Saginaw, Mich. The plant, originally built for aluminum forging, has been leased by Chevrolet. Chevrolet says the lease arrangement is no longer economical.

The General Services Administration put the plant up for sale early this year. Chevy was the only bidder. Only roadblock to the sale is approval by the Dept. of Justice.

VW Changes—The 1962 Volkswagens will have pretty much the same appearance as the familiar outline of the old VW. Some mechanical changes have been made, although minor.

A gasoline gage has been added. There are mountings for seatbelts, windshield wipers, partly reclining front seats and a steering column lock. Reports say the price will go up $30 in Germany.

Production in calendar year 1961 is expected to total 1 million cars, trucks and station wagons, compared with 865,000 in 1960.

Scratch One—Borgward, German auto producer, may be going out of business. Saddled by heavy debts and sales problems, Germany's fifth largest automaker says it will dismiss 17,000 workers. This follows several unsuccessful tries to sell its holdings to foreign auto companies.

Among those approached were the British Motor Corp. and Chrysler Corp. The company was taken over several months ago by the West German state of Bremen.

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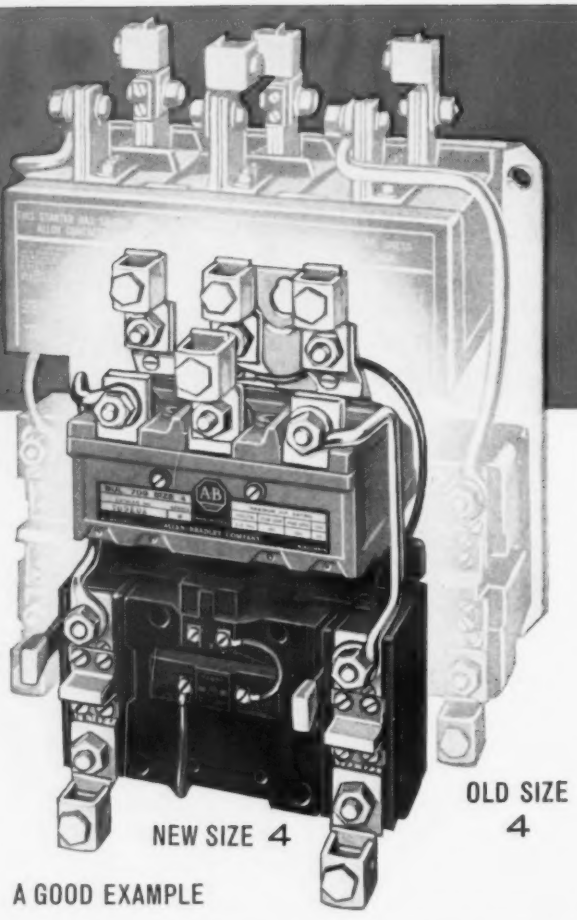
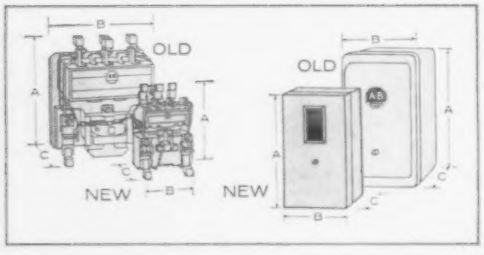


A GOOD EXAMPLE



The new revolutionary Bulletin 709 motor starters are surprisingly small in size—yet, they are good for many more millions of operations—without trouble or maintenance! Rating for rating, they have no equal. They are today's best starter value—and they cost no more!

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	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD
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1	6 5/8	5 7/8	4 5/8	5	3 11/16	3 1/4	10	8 13/16	6 13/16	6 3/8	4 5/8	4 1/4
2	7 5/8	10 1/16	4 5/8	5 3/4	3 11/16	4 7/32	12	14 1/2	7 5/8	9	4 5/8	5 7/16
3	10 1/4	12 5/8	6 1/4	7 1/4	5 7/32	5 7/16	16 5/8	19 1/2	10 3/8	11 3/8	7 1/4	6 11/16
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Industrial Guide to California

Here's Latest Checklist of New and Growing Companies

The orange groves are rapidly disappearing and industry is springing up in their place.

Smart marketers will clip this latest guide for reference in planning future calls.
By R. R. Kay

■ The march of industry to California keeps up at a steady pace.

New and expanding plants are busting out all over the state. For the first five months, in northern California alone, over $110 million was committed for 449 industrial projects.

In southern California, it's the same story—only more so.

Here's an up-to-date list of new and growing companies and the products they make:

Defense Oriented—Western Div. of Aeroquip Corp., Burbank—flexible hose and couplings, hydraulic and pneumatic components. Surface-Air Electronics Co., El Segundo—test equipment, power supplies. R & R Tool & Die Corp., North Hollywood—machine shop.

Femco Div. of Harvill Corp., Dominquez—hinges for commercial and military aircraft. Delta Sonics, Inc., Hawthorne — ultrasonic and electronic equipment. B & B Metal Fabricators & Supply Co., North Hollywood—sheet metal shop. General Aluminum Corp., Torrance—tubing and coils.

Playing to Plating—Monarch Marking System Co., Garden Grove —marking machines. J. W. Fecker Div. of American Optical Co., Santa Monica — inertial guidance test equipment; optical and astronomical instruments. Long-Lok Corp., Santa Monica—fasteners.

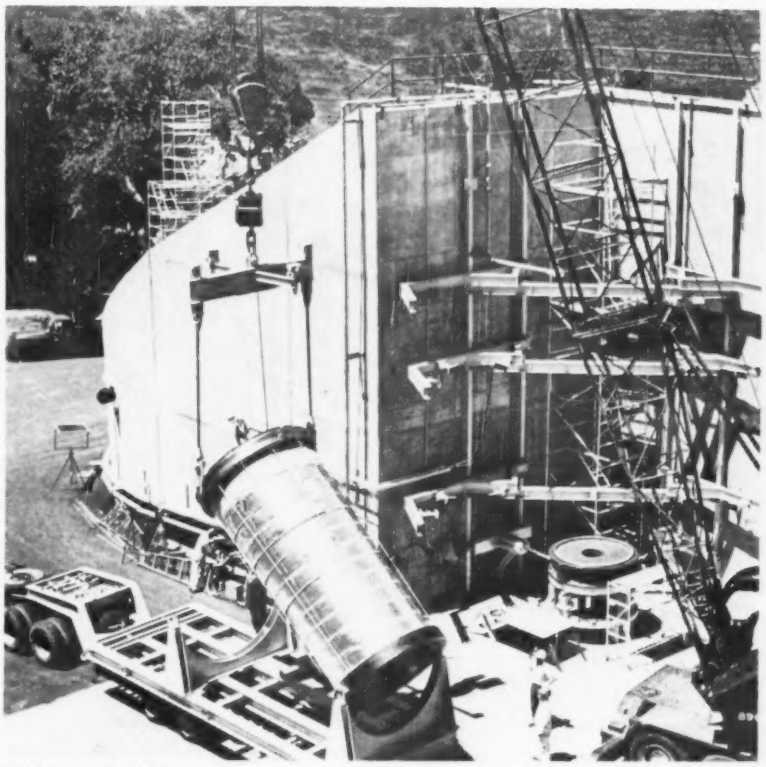
Rex Precision Products, Inc., Culver City—ferrous and non-ferrous castings. Michael-Rand Plating Co., Inc., Sepulveda—metal plating. Datex Corp., Monrovia—digital data systems. P. K. O. Industries, Santa Monica—home gym equipment.

Plastics and Power — Nylock-Western Div. of Nylock Corp., Gardena — fasteners. Metal Bellows Corp., Chatsworth — welded metal bellows and bellows assemblies. Sloane Manufacturing Co., Sun Valley — plastic pipe fittings. Space-General Corp., Rosemead — space vehicle components and systems.

American Tool & Die Co., Inc., Los Angeles—tools for aircraft industry. Robbins Aviation, Inc., Vernon — gas purification-dehydration equipment, valves. Jensen Electric Co., Inc., Los Angeles — special lighting and power installations.

Radioplane Div. of Northrop Corp., Rancho Conejo — missile systems, target aircraft.

Future Rockets to Get Solid Boost



SOLID BOOST: Center segment of a booster-size, segmented solid propellant rocket motor is prepared for test at United Technology Corp.'s development center at Morgan Hill, Calif. In a recent test the nearly 30 tons of solid propellant produced approximately 250,000 lb of thrust.

How To Engineer A Better Product Finish...FOR TOMORROW

Where product or component finishes involve critical limits—in areas of tolerance, unit-cost or rate of production—abrasive engineering discussions often continue late into the night. And, whether the subject be planning for a new product or a cost-reduction problem on current production—*the man to sit in with you is your Carborundum field engineer.* He brings to your office a tremendous accumulation of practically tested abrasive knowledge and experience. Trained in all major abrasive methods employing either belts, discs, wheels, abrasive grains and powders—he recommends impartially. For maximum efficiency with abrasives, this help is always available from your Carborundum district office. A phone call will do. **CARBORUNDUM**

Space Race Challenges Industry

New Machines and Production Techniques Are Needed

How well and how fast the U. S. advances its space effort, depends, in part, on the machine tool industry.

Second-generation space vehicles demand greater precision production than ever before.
By R. H. Eshelman

■ With the stepped-up American space effort will come many new demands on the machine tool industry. The first generation of missiles and space vehicles is now considered old hat. Already the aerospace industry is rocketing into a new era.

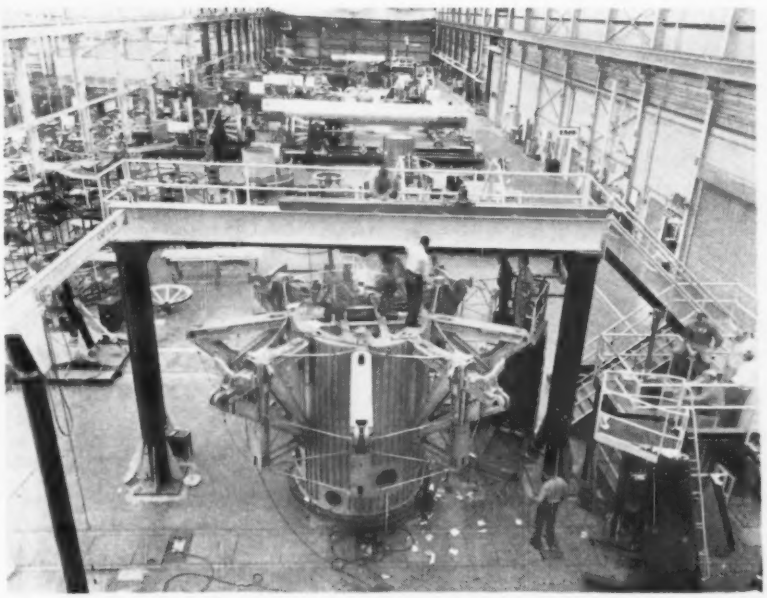
Recent technical meetings forecast development of supersonic transports, space stations, manned shuttle ships and vertical takeoff planes.

In the Lap—Problems of putting man in space now are squarely in the lap of tool and production engineers. New techniques of production, new machines and equipment are needed to make the parts and assemblies for these new vehicles, say the experts.

Some manufacturing executives note that what is developing in the aerospace field is a new type of custom precision production unlike anything known previously.

Need Heat—Says S. N. Bean, assistant director of operations, Lockheed Missiles and Space Div., "We are now working in metals which are capable of retaining adequate structural strength at temperatures created by high-speed reentry into the atmosphere. These are extremely hard and tough to work at normal room temperatures."

Such materials, he points out, must be worked at or near their plastic temperatures. This means new methods of applying large amounts of heat to the materials, and accurately sensing and controlling the temperatures.



THE OCTOPUS: Outriggers are fabricated at NASA's Marshall Center. Attached to the corrugated tail section, they hold the eight engines which form the first-stage booster for the big Saturn rocket due for tests soon.

Needed Now—"Quantity of missile production is limited," Mr. Bean points out. "So in most cases single-purpose machines are not the answer. Equipment that can perform a special type of operation on several different parts is needed now."

Some of the problems posed by advanced, second-generation space designs show up in the Saturn program. Headed by Dr. Werner Von Braun of the NASA Marshall Space Flight Center, Huntsville, Ala., the big rocket is well along. A prototype unit of the first big booster is to be static tested soon.

Problems of Size—That's not to say manufacturing headaches have all been cured. How do you make and haul to the firing site a booster too big to be handled by truck or railroad? How do you maintain precision required for mechanical reliability in assembling components of this size?

Saturn, largest of current space projects, will be about 180 ft high, liftoff weight will be about 500 tons.

Quality Counts—Marshall Center fabrication specialists stress the challenge to industry in controlling quality to the high level to attain reliability essential for operation.

Minor Details—Too often, say aerospace executives, suppliers fail to realize importance of seeming minor details.

MEN IN METALWORKING

Willys Motors, Inc. — James Beattie, Jr., elected vice president and general sales manager.

Radio Corp. of America—J. J. Graham, appointed division vice president, operations.

Micro Metals Corp. — M. K. Tudor, named executive vice president and a director.

American Orbitronics Corp.—S. L. Todd, named secretary-treasurer.

General Electric Co. — J. S. Parker, appointed vice president and group executive, Electronic and Flight Systems Group; R. E. Pfenning, elected comptroller, and V. B. Day, elected vice president, Relations Services.

G. L. Phillippe, elected president, General Electric Co.

C. W. LaPierre, elected executive vice president, General Electric Co.

International Business & Industries, Inc.—M. L. Mandeville, appointed president.

Worthington Corp. — W. A. Meiter, named vice president, Washington services.

Weirton Steel Co.—A. W. Pettit, named asst. vice president, sales; J. T. Mayhew, named manager, B. W. Jones, named asst. manager, and John Macdonald, named superintendent, Sheet Mill Dept.

G. M. Diehl Machine Works, Inc.—C. W. Tuttle, appointed president.

Crouse-Hinds Co.—R. W. Cummings, elected vice president, finance.

Gabriel Co.—W. R. Donnelly, appointed vice president, finance.

Union Carbide Corp. — R. A. Charpie, appointed manager, advanced developments.

American Potash & Chemical Corp.—W. P. Huhn, Jr., appointed manager, metallurgical services.

Chrysler Corp.—John vonRosen, appointed director, corporate manufacturing staff and services.

Dayco Corp.—J. A. Conlon, named vice president, sales, Rubber Products Div.

Allis - Chalmers Manufacturing Co.—D. T. Seag, appointed assistant director of research.

Bessemer & Lake Erie Railroad Co.—P. H. Taylor, appointed manager of pricing.

Colorado Fuel & Iron Corp.—B. D. Egley, appointed maintenance and engineering foreman, Power Div., Pueblo plant.

Federal Pacific Electric Co.—R. P. Bennett, appointed manager, relay marketing dept., Cornell-Dubilier Electronics Div.

(Continued on P. 88)

W. E. Mullestein, appointed vice president and general manager, Lukens Steel Co.

C. E. Ford, named director of development, National Carbon Co. Div., Union Carbide Corp.

C. E. Anderson, elected president, chief executive officer, and member of the board of directors, E. W. Bliss Co.

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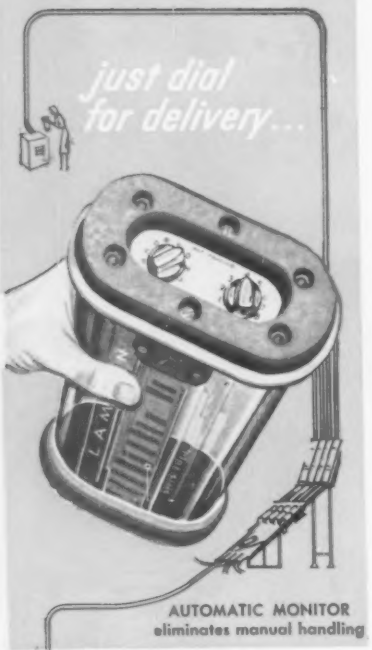

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LAMSON CORPORATION

(Continued from P. 86)

Ford Motor Co.—J. C. Dean, appointed asst. controller.

Fostoria Corp. — C. W. McDaniel, appointed general manager, Electrical Products Div.

Houston Fearless Corp.—F. C. Mehner, appointed general manager, Pacific Div.

Fansteel Metallurgical Corp.—J. G. Duggan, elected secretary and treasurer.

American Can Co. — G. G. Hoover, appointed manager, tin plate div., purchases and traffic dept., Canco Div.

Anaconda Wire & Cable Co.—W. J. Plate, named manager, rubber and plastic specification products.

Inland Steel Co.—G. M. Burrier, appointed asst. general manager, primary production, Indiana Harbor Works.

Kaiser Aluminum & Chemical Corp.—J. J. Fehr, appointed north central branch sales manager, foil and container products, Kaiser Aluminum & Chemical Sales, Inc.

Bethlehem Steel Co. — J. O. Dague, appointed general manager, Steelton plant.

Alan Wood Steel Co. — G. C. Campbell, named chief industrial engineer.

Republic Steel Corp. — R. F. Armitage, named manager, Warren, O., district; A. A. Kappenhagen, appointed asst. manager, Warren district; G. A. Johnson, named chief engineer, Union Drawn Steel Div.

Meaker Co.—J. L. Ross, named general manager.

Carpenter Steel Co. — R. W. Titgemeyer and K. C. Largent, appointed district managers, Los Angeles and San Francisco areas.

Dodge Manufacturing Corp.—C. M. Brown, appointed superintendent, foundry.

Hughes Aircraft Co. — L. P. Johnson, named product exploitation director.

R. S. Fries, appointed manager, manufacturing and engineering, Brown Instruments Div., Minneapolis-Honeywell Regulator Co.

Aluminum Co. of America—S. T. Gustina, elected controller.

Reynolds Metals Co.—N. C. Dostal, named market manager, prefabrication and component manufacturers, Architectural & Building Products Div.; D. S. Cvacho, named director of packaging engineering.

General American Transportation Corp.—R. E. Sheehan, appointed field sales engineer.

Grove Valve & Regulator Co.—K. S. Adamson, named application engineer, regulators.

Heppenstall Co. — P. L. Della Donna, named manager, Cleveland sales office.

Electric Autolite Co.—J. A. DiMizio, appointed plant manager, Los Angeles; I. P. Siminoff, named national accounts manager, West Coast district.

Molded Fiber Glass Body Co.—D. C. Searl, named manager, quality control.

National Lead Co.—C. B. Winslow, named manager, Paint Div., Cleveland branch.

McKay Co.—J. C. Carey, appointed sales manager, Chain Div.

Cannon-Muskegon Corp.—Peter Stefan, appointed sales manager.

Emhart Manufacturing Co.—J. H. Taylor, named manager of products and market planning.

Reflectal Corp. — G. L. Smith, appointed general sales manager.

Hancock Telecontrol Corp.—J. J. McCarthy, Jr., named sales representative.

Fairchild Camera & Instrument Corp. — Frank Rupp, appointed manager, market and product planning, Special Products Div.

Reese Metal Products Corp. — D. B. MacKay, named sales manager.

Howe Sound Co.—William Mugan, appointed general manager, Labeled Metal Products Co., Div.

Warren Pumps, Inc.—R. D. Butler, Jr., named sales manager, Boston.

Jervis B. Webb Co.—D. C. Clark, appointed manager, Merchandise Sales Div.

Package Machinery Co.—J. M. Chalfant, appointed manager, foreign operations.

Daystrom, Inc. — D. S. Taylor, named development engineer, Military Electronics Div.

Motorola, Inc.—C. P. Nierzwicki, named manager, defense programs.

Vickers, Inc.—L. C. Immel, appointed manager, regional office, Aero Hydraulics Div.

Whiting Corp.—C. D. Schmidt, named manager, Detroit sales office.

Gilbert Merrill Steel Corp.—S. C. Kadish, appointed regional manager.

Campbell Chain Co. — M. F. Mangan, named project engineer, western states.

Buell Engineering Co. — S. E. Specht, appointed general sales manager.

Rotor Tool Co.—Harold Burton, named sales engineer.

OBITUARIES

Dr. Anson Hayes, 79, vice president, research, Armco Steel Corp.

E. P. Hagan, 53, vice president and comptroller, Worthington Corp.

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CONVERGING SECTIONS

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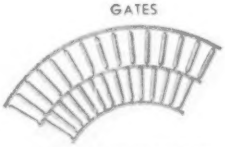
STOPS

PIVOT SWITCHES

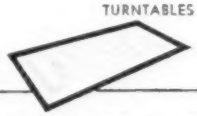
to move goods out!

GATES



THREE RAIL SECTIONS

TURNTABLES



LET LAMSON ENGINEERS show you how the expert use of accessories can transform a number of stubborn conveyor units into a free-flowing, flexible conveying system.

Some of the LAMSON accessories are shown at left. But others like UPENDERS, ROLL-OVER FRAMES and DROP ROLL SECTIONS must be designed and custom made by LAMSON for specific application problems.

And not one such problem has arisen during the past 80 odd years that LAMSON engineers could not solve. They're justly famous for providing efficient, complete, "Turn Key Jobs."

Check LAMSON for advice. Send for the new conveyor catalog today. Write 104 Lamson Street, Syracuse, New York.

PIONEERS *the Conquest* OF INNER SPACE

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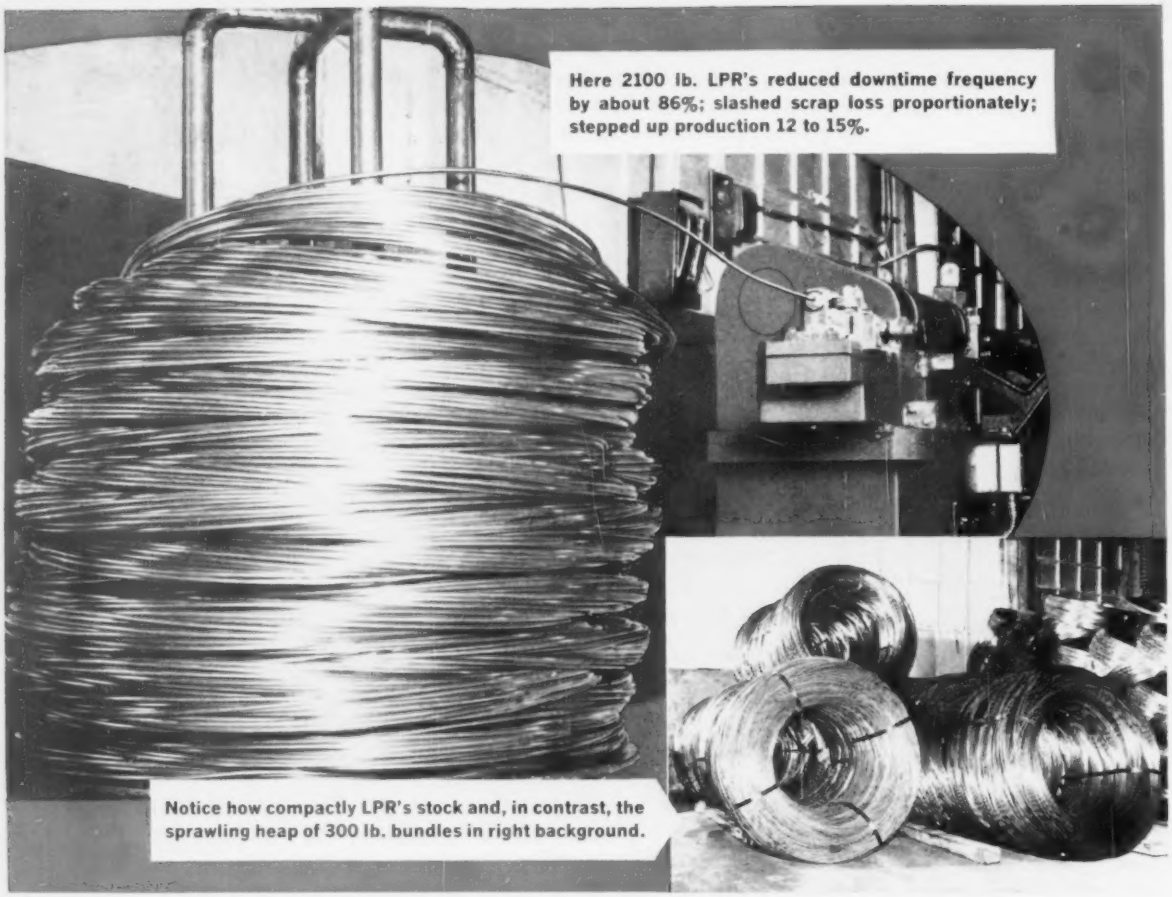
Here 2100 lb. LPR's reduced downtime frequency by about 86%; slashed scrap loss proportionately; stepped up production 12 to 15%.
Notice how compactly LPR's stock and, in contrast, the sprawling heap of 300 lb. bundles in right background.

How DSC-PORTSMOUTH LPR® COILS cut your handling, fabricating and material costs

HIGHLIGHTS OF LPR EFFICIENCY

LPR's save you money in a dozen ways. Yet, size for size, grade for grade, they cost no more than Brite Wire in short-run bundles.

With LPR's you store your wire in less space, more accessibly; you move more wire in less time; you fabricate more wire per shift at lower man-hour costs; you minimize coil remnant scrap to reduce your material cost per product unit.

WHAT USERS REPORT

Here are excerpts from reports volunteered by Brite Wire fabricators who switched from conventional short-run bundles (150 to 400 lbs.) to LPR's:

Downtime due to coil changes reduced as much as 95% . . . Unloading time alone cut as much as 82% . . . Productivity increased from 20% to 33⅓% . . . Scrap slashed in direct ratio to coil changes avoided (up to 95%) . . . Man-hour costs trimmed 20% and more . . . Storage space reduced by 20% to 50% . . . Inventory management greatly improved . . . Returnable carrier problem and small coil racks eliminated.

Interested in learning more about LPR savings? Just call your nearest DSC Customer "Rep" or write: DETROIT STEEL CORPORATION, BOX 7508, DETROIT 9, MICHIGAN

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Detroit Steel Corporation—General Sales Office, Detroit 9, Michigan
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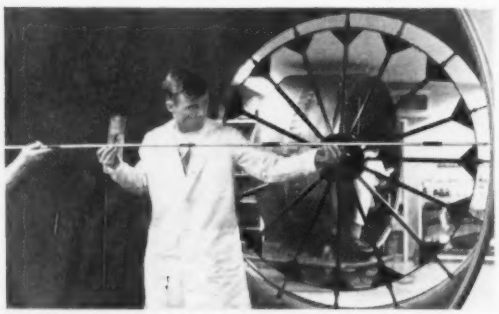
Solid Fuel Moves Up

Solid-fuel rocket experts contend their hardware can beat a liquid booster for use on Nova.



CHECKS DIAMETER: For a solid segment.

Deputy Defense Secretary Roswell L. Gilpatric told Congress the choice between solid and liquid Nova systems can be made by 1964. An estimated $500 million will cover the solid-fuel rocket's development. Sixty-two million dollars will be spent in fiscal 1962.

NASA Protects Contractors

NASA is getting new powers to insure space contractors against financial loss in major accidents. Contractors and subcontractors working on space projects will be eligible for reimbursement for death and damage claims rising out of major accidents. However, the project must first be judged "extremely hazardous." Then the government will only pick up the tab when private insurance has been exhausted.

Congress Calls For Action

The orbiting of Russia's second cosmonaut has increased Congressional demands for a U.S. space speedup. Moves are being made to put programs into effect quicker than NASA's $1.7 billion for the year will allow. Leaders of both the House and Senate space committees call for a manned orbital shot by November of this year. The budget was to hold until June.

Resists Hydrogen's –423°F

A new super rocket, one of the first to use liquid hydrogen fuel, will have aluminum for its major structural material. Aluminum alloys were selected for the Saturn IV because of their marked resistance to brittleness at –423°F, the temperature of liquid hydrogen. Alcoa will supply the bulkheads, part of the framework and a ½-in. thick plate for the rocket skin, which also forms the fuel-tank walls. The four-story structure will be powered by six 15,000-lb thrust engines.

Keeps an Eye On Space

A unique device tests the accuracy of new electronic equipment to insure precise rendezvous of satellites and rocket vehicles in space. The device, called a lightbeam modulator, is carried aboard a space vehicle. It provides a constant stream of position data on other speeding satellites. The modulator advances the art of sending

BRIGHT BEAM: Finds satellite's position.

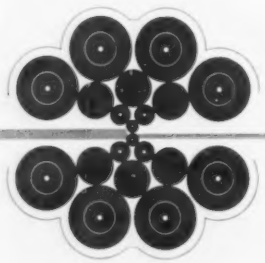
and monitoring light beams millions of miles into space. When used with a Laser light source, beams a million times brighter than the rays of the sun are generated.

Hear Sub—Will Destroy

A $1.5 million contract for production of ASROC (Anti-Submarine Rocket) missile-launched depth charges has been awarded to Goodyear Aircraft Corp. by the Navy. ASROC, an integrated system of sonar underwater detection gear, fire-control computer and a launcher holding eight missiles, increases a destroyer's attack range. The depth charge is launched to a predetermined spot. Then it separates from the rocket and sinks into the water, detonating at a selected depth.

Report:

THIN GAUGE TINPLATE



How Sendzimir Mills help you compete in this growing market at an extra profit per ton

The growing market for thin tinplate below .008" thickness presents tinplate producers with both a problem and an opportunity.

The problem is not only to gain extra capacity for rolling these new gauges, but to achieve three other benefits:

a — reduce the normal production losses of lowering the finish gauges on present tandem equipment

b — eliminate the additional downtime of extra roll maintenance

c — provide the flexibility to take short runs

THE ECONOMICS

From a profit standpoint, thin gauge tonnage can be best achieved by combining present tandem facilities with a Sendzimir Mill. The tandem mill will roll approximately double the thickness required and supply coils to the Sendzimir Mill for single pass rolling to finished gauge. This provides an immediate tonnage gain from the tandem mill, since the finishing is on the separate Sendzimir Mill and eliminates the tonnage loss from lowering finish gauge on the tandem mill. Thus rolling time will be made available for the finishing of heavy gauge tinplate by the tandem mill.

SHORT-RUNS

Beyond the profit possibilities in producing thin gauge tinplate, the tandem and Sendzimir combination offer other production benefits.

You get the flexibility to make short runs with minimum interference to production on either coated tinplate, annealed or full hard black-plate. Actually, the Sendzimir Mill can make short runs of any low carbon steel rolled on the tandem mill and do it at a profit.

HOT MILL BENEFITS

Finishing lighter gauges on the tandem mill normally require lighter starting gauges. But with the Sendzimir Mill available, the hot rolled coils to be run at semifinished gauges can be substantially heavier, thus increasing production off the hot mill.

INSTALLATION AND OPERATING COSTS

The compact Z-Mill permits low foundation and installation costs. Less building area is needed. The small work rolls of the Z-Mill are replaced in seconds, reground faster on smaller grinders, handled easily. Downtime is reduced, operating efficiency is higher.

FINISHED PRODUCT

The Sendzimir Mill adds to your capacity a product quality unmatched by any other rolling system.

Strip flatness is maintained by adjustment of mill shape through the power crown control while the mill is operating. Strip edge pressure is controlled by lateral adjustment of the tapered intermediate rolls.

It is never necessary to compromise on surface quality because freshly ground work rolls are inserted so readily that consistently superior strip finish can be attained.

Because the smaller work rolls respond more readily to gauge adjustments, gauge is held more accurately and heavy ends can be brought into tolerance for an increase in yield.

PROOF

For a specific proposal of the way these benefits can be applied to your own mill operation, write or telephone Rolling Mill Machinery Sales. Phone Browning 2-3271, DDD Code 203.

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Vacuum Melting: Bigger Ingots For Bigger Markets

Missile and industrial equipment manufacturers are calling for larger and larger vacuum-melted forgings.

To meet this demand, vacuum melters are installing new furnaces to provide record-size ingots.

By **C. L. Kobrin,**
Metallurgical Editor

▪ Vacuum-melting capacity in the U. S. got a healthy boost when Midvale-Heppenstall Co.'s giant new consumable electrode furnace recently joined the ranks.

Standing 40-ft tall, the new vacuum-melting furnace is designed to turn out ingots up to 60-in. diam with a weight of 80,000 lb. Projected annual output: 8000 tons.

Points Up Trend—This move by Midvale-Heppenstall points up the trend towards larger and larger vacuum-melted ingots. Other vacuum melting furnaces in the Philadelphia plant turn out ingots up to 21 in diam. The new furnace is already producing 40-in. diam ingots weighing as much as 25 tons.

"There are two main reasons for this shift to larger ingots," explains H. H. Casey, manager, special projects.

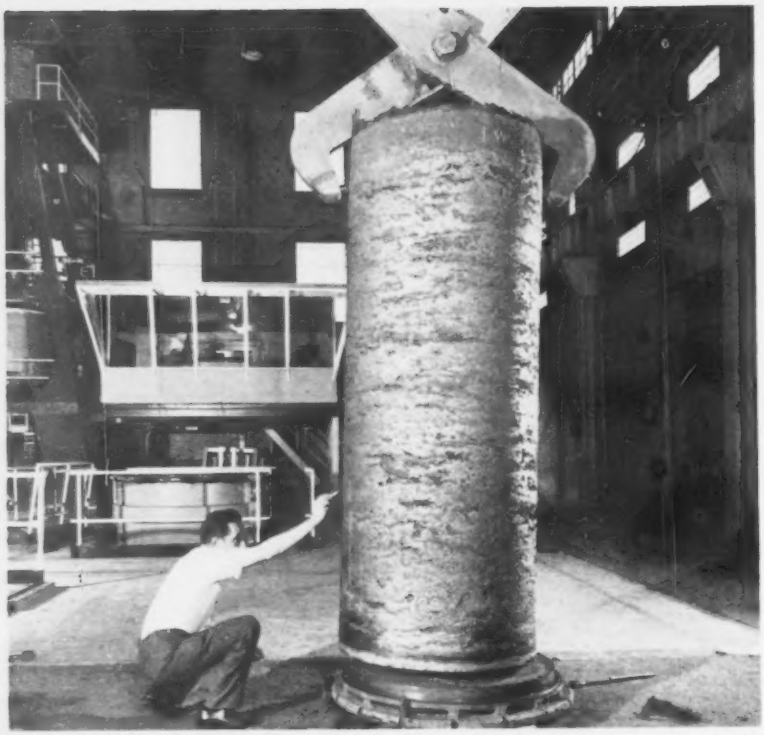
"Equipment is getting larger. There's a definite need for larger forgings—that are subject to high stresses—that call for vacuum-melted steels. Greater productivity is the other reason."

Non-Military Gains—Though the bulk of vacuum-melt steels are heading towards U. S. aerospace programs—such as Polaris, Minuteman, Pershing — Midvale-Heppenstall believes that non-military markets for vacuum-melted steels will also continue to expand.

The new furnace will improve Midvale-Heppenstall's position as an industrial supplier of hardened and ground forged-steel rolls, shafting and gears.

Ultraclean Steel—By melting in vacuum, inclusion-forming elements, and gases are removed. Result: An ultraclean steel in which workability and mechanical properties, including fatigue life, are greatly improved. For these advan-

CHECK SURFACE: Midvale-Heppenstall's H. H. Casey and J. M. Ford check surface of vacuum-melted ingot while crucible is being stripped. Giant consumable-electrode furnace can be seen in the background.



TAKES TEMPERATURE: After temperature is recorded, ingot goes to forge shop for conversion into high performance mill rolls or missile parts.

NEXT ON SCHEDULE: Midvale-Heppenstall's H. H. Casey (left), manager, special projects and J. M. Ford, superintendent of melting, discuss scheduling of new furnace. It takes about 25 hr to make a 25-ton ingot.

tages, a buyer pays substantially more than the price of an air-melted steel.

Thus, both high-alloy and low-alloy steels will be melted in the new furnace. Included are: AMS M-256, Discaloy, INCO 901, Ladish D6AC, A-286, PWA 1002, Jessop H-53 and Type 347 stainless steel.

Test results with the 40-in. steel ingots, reports the Midvale-Heppenstall metallurgical laboratory, show that center quality compares favorably with 21-in. ingots.

Gas analyses show hydrogen to be very low—about 2½ ppm for high-alloy steels and less than 1 ppm for low-alloy steels.

An Hour Per Ton—How long does it take to make a melt? "One hour per ton is a safe estimate," answers Mr. Casey. Making the 25-ton ingot shown on this page took little more than one day.

"Moreover," points out Mr. Casey, "there's virtually no downtime. While one ingot is melting, a second-water jacketed crucible is charged with a 36-in. diam electrode.

"As the first crucible transfers to a prescribed spot on the plant floor for stripping, the second assembly is loaded. All that's required then is to weld the electrode to the stub using the furnace arc. Melting can then proceed." Time for changeover: About 15 minutes.

Waste No Time—Little time is lost in processing the hot (1000°F) ingot. After its temperature has been recorded, it's quickly shipped to the forge shop.

Heating comes first. Then, as in the case of the 25-ton ingot, it's rounded up and hot cut into blocks. Upset forging follows. Result: Three 10,000-lb turbine bucket wheels. And metal quality will assure reliable performance.

Reprints of this article are available as long as the supply lasts. Write Reader Service, The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Ask for Reprint **No. 203**

New Plastic Stands Up Outdoors

Polyvinyl-Fluoride Film Sets Sights on Metalfinishing

Few plastics are any match for the continuous beatings from the sun's rays.

Here's one that has outstanding weatherability. It can be laminated with metals, too.

By **R. R. Irving**

▪ Tedlar is the name of a commercially new plastic that is expected to play a key role in the metalworking industry. About one year from now, a new plant in Buffalo will start production runs of the material.

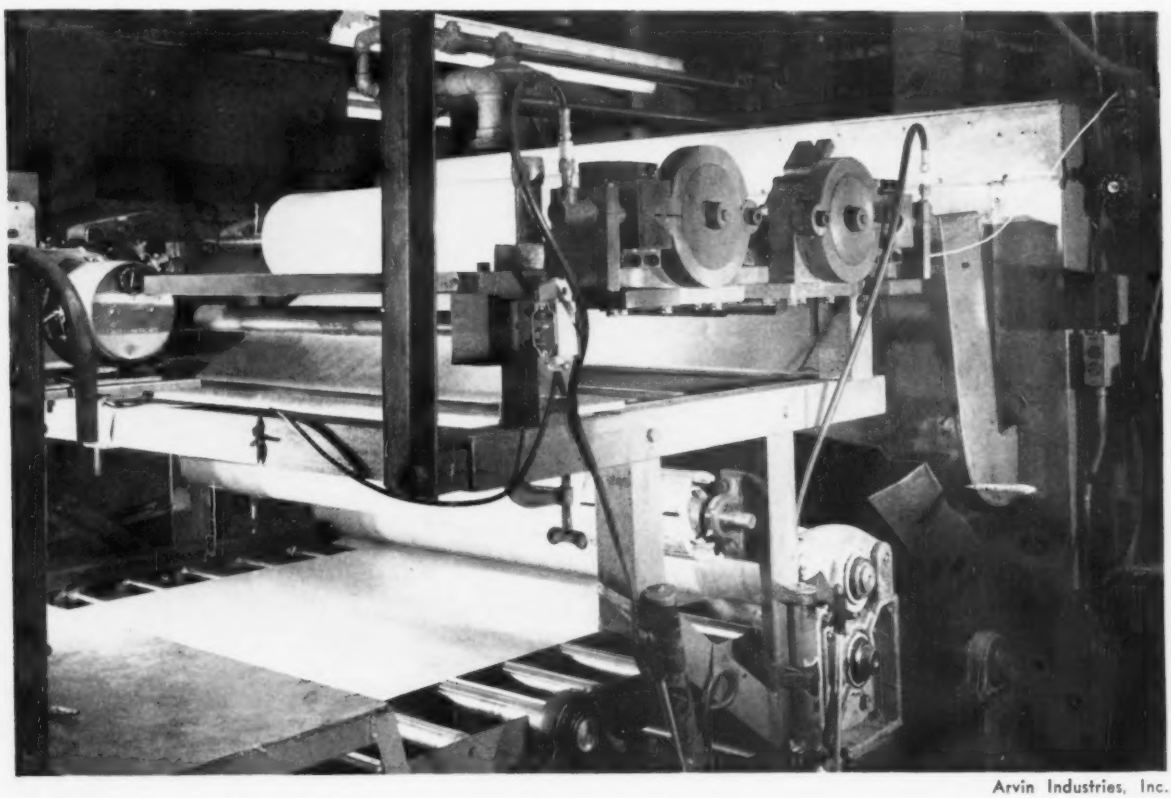
What is Tedlar? How can it be used by metalworking? Tedlar is the du Pont Co.'s trade name for polyvinyl fluoride. The material has been around for a long time, but only in the research and development stage. It will only be available in the form of film.

This film material is expected to compete with paint. When applied to a metal surface, it even looks like paint. Some major economies are involved, however. In painting, metal forming is usually completed before the coat is applied. With Tedlar, the film can be applied to the metal, then postformed, without running the risk that the plastic coating will crack.

Easy Conversion—In this manner, existing paint lines can be converted easily to the new system. The same lines for metal preparation are required for this scheme, too. It's much the same as the equipment needed to bond rolls of vinyl to steel. No added work space is needed.

To laminate Tedlar, a special type of adhesive is required. As far as speed is concerned, the laminating line will move as fast if not faster than a conventional paint line.

What can the new material give you that you can't already get from vinyl coatings? Greater strength, for one. Tedlar is reported to be many times as strong as vinyl. Another factor really puts the new plastic in



Arvin Industries, Inc.

EASY TO LAMINATE: PVF film can be laminated to sheet-metal stock using standard equipment. Film is on the upper roll. Nip roll is in the center. Galvanized sheet on the rollers has already been laminated.

UP OR DOWN: Plastic side of laminate can serve as production area ceiling. Then metal side can be used to support poured concrete roof.

SIDING PANELS: Factory-finished metallic siding panels clad with Tedlar have longer life than panels finished in lacquers or enamels.

a berth by itself. Tedlar has outstanding weatherability.

Exposed to the Sun—Some years ago samples of unsupported film were exposed to the damaging Florida sun. After seven years, the samples were checked for properties. They had not been discolored. They were still flexible. They still retained 50 pct residual tensile strength.

Officials at du Pont point out that the film would hold onto its properties anywhere from two to four times as long if it had been combined as a laminate. The reason that the material is so weatherable can be traced to the fact that it is inert. Also, the new plastic does not absorb ultraviolet light.

At present, the film is being produced in limited quantities at a pilot plant in Buffalo. Several varieties are in production. In thickness, rolls are produced in ½, 1, 1½, 2 and 4 mils. Standard width is 48 in., although both 38 in. and 24 in. widths are made in some types.

Choice of Color—Current colors include white, green and gray, in addition to transparent film. Within a year, other colors including beige, yellow and aquamarine will be added to the list.

Probably the biggest single market for Tedlar-coated metals will be in building materials. Such products as roofing, siding, ductwork and gutters are logical targets.

The film also possesses a high dielectric constant. This factor could uncover added markets. Insulation and cable fabrication are two strong possibilities.

Outdoor Products—The weatherability of this polyvinyl-fluoride film is the main trait that tips the scale. It can stand up outdoors.

Given added strength from metals, the new laminate offers a wide variety of possible materials. Du Pont claims that the plastic can be bonded to any metal. Particular success has been noted with aluminum and aluminized steel. Galvanized

steel is another likely metal.

The company had to find a new family of adhesives for the application. The adhesives are modified acrylics. They are designed to overcome the inertness of the plastic.

Looks Like Paint—The casual visitor in the company's Chestnut Run Laboratory might be tempted to pick up a sample of laminated material for closer study. What do you see? In your hand might be a deep-drawn section of aluminum. On the outside is a coating of paint, apparently.

Although the coating is only about 2 mils thick, it isn't paint at all. It's polyvinyl fluoride. The thickness is a uniform 2 mils throughout the entire surface. Here, you have the kind of built-in quality control you'll never get from paint. The thickness at the curved corners is just as thick as it is on the flat surface.

Passed the Bend Test—Samples of PVF-aluminum laminates have withstood the severe 180° bend tests without peeling or cracking. According to du Pont, it's very likely that the metal will rupture before the plastic.

After the metal strip or sheet has passed through a stage such as Bonderizing, it can be laminated to PVF in the nip rolls. The trick here is to be sure that the metal at this point has reached the required temperature range of 390°-400°F. This temperature is vital to insure proper lamination.

Where a PVF coating will be 1 mil thick, paint might be 1½ mils thick. That's one reason that they are so similar in appearance.

More Test Results—As a surface material, PVF holds its own. The results of a Bell abrader test indicate that Tedlar takes 4 to 6 minutes to wear per mil. With lacquers and enamels, this time is cut to one-half to one minute. PVF also has superior chip resistance than lacquers and enamels.

The cost per pound of Tedlar will be high in comparison with paint. However, you must remember that PVF should last much longer than paint. The fact that the laminate can be postformed is another consideration.

Cousin to Teflon—Tedlar is a fluorocarbon. Like another one of du Pont's fluorocarbons, Teflon, it resists all sorts of attack from acids, alkalis and solvents. Put an aluminum-PVF laminate in a caustic bath. Then you can sit back and watch the aluminum etch away while the coating of polyvinyl fluoride remains intact.

To the building trade, Tedlar should furnish a useful outdoor life of 20 years or better. End laminates can be hydroformed, roll formed and matched die formed. The material can be printed. It can also be metallized.

Metalworking may also hear from PVF when laminated to non-metallics. One to watch is certainly reinforced plastics. Here are a few possibilities for this combination: Truck bodies, parts for autos and aircraft, lawn-mower housings and sign board trim.

Offers Excellent Properties

Property	Type 20	Type 30	Type 40
Zero strength, °F	570		
Density, g per cc	1.37		
Area factor, sq ft per lb per mil	139		
Tensile strength, psi at 68°F	15,000	12,000	7000
at 300°F	3300	3300	1000
Elongation, pct at 68°F	100	140	190
Tensile modulus, psi at 68°F	300,000		
Tear strength, g per mil	10	15	40
Impact strength, kg—cm/mil	5	3	1
Bursting strength, psi per mil	37		
Flex life, cycles, 1-2 mils at 0°F	40,000		
at 68°F	70,000		
Thermal aging, hours to embrittlement at 300°F	3000		
Shrinkage	5 pct at 270°F	5 pct at 330°F	2 pct at 330°F
Coefficient of expansion, in. per in. per °F	24 x 10^{-6}		

* These are average test data and are not to be considered as specifications.

POTENTIAL USE

Solar energy structures
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Insulation jacketing
Gutters
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Outdoor signs
Siding
Building panels
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Ask for Reprint **No. 202**

Punched Cards Cull the Facts

By **L. S. Coleman, Jr.**—Chief Accountant, Kutztown Foundry and Machine Corp., Kutztown, Pa.

The sooner you get the facts on production, the sooner you can make profitable decisions for your company's future.

Data processing might be just the tool to get the ball rolling.

■ Every time a job shop estimates a new order, there is a chance that it may lose its shirt. At the Kutztown Foundry and Machine Corp., in Kutztown, Pa., however, this risk is minimized through a new low-cost data processing system.

Data on every job entering the shop are translated right away into punched card form. Then mechanized equipment takes over to record, project, summarize and analyze.

Three main benefits result. You get a case history which can be put to good use in future jobs. You can save on production. And your workers and customers will derive more satisfaction.

Low-Cost Equipment—These results come from a small and inexpensive punched-card setup. We are deriving benefits right down the line, too. At every point in our production procedure, the use of IBM equipment provides facts and figures never available before.

At the Kutztown Foundry we are called on to mold castings of unusual size, shape or specifications. Sometimes all three of these requirements are encompassed in one job. This means an even more complex problem of compiling costs and keeping control.

On a daily, weekly and monthly basis we can tell what jobs are in the shop, where they are located, in what stage they are right now. We also know how much labor and machine time is being expended on them and what each step costs. Furthermore, we get this information while the operation is still in progress.

All of this has added up to extreme control, efficiency and savings. Although our yearly volume does not justify a costly data-processing setup, we find that the IBM Series 50 machines actually cost no more than our previous semi-automatic system. Yet, our new unit produces many more benefits.

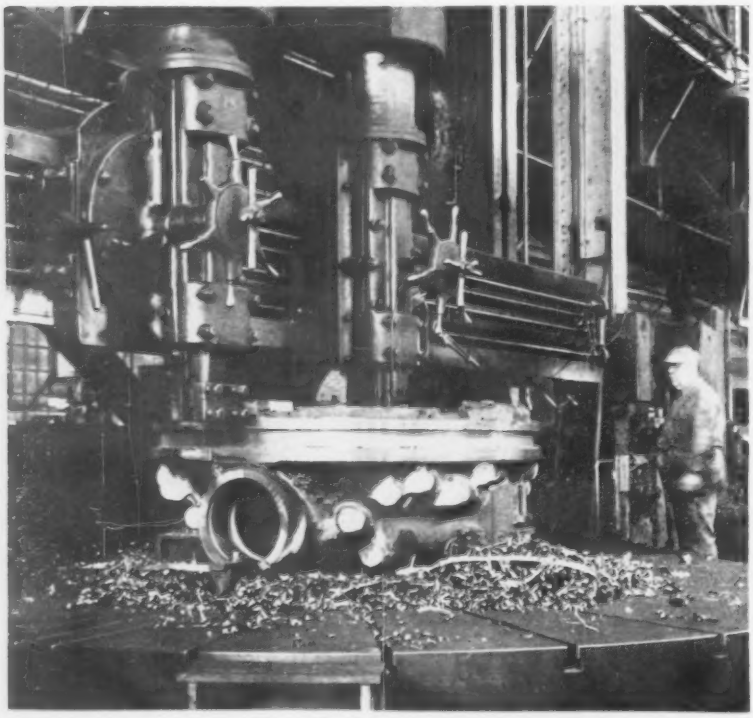
Timely Reports—We now provide our production manager with detailed daily figures which show him where we are on each job in every work center of the plant. This is the first time we've been able to come up with these figures.

When a customer's order comes into the plant all information is transcribed onto an offset master form. This master is then used to run off a series of shop order forms and IBM job and load cards. These documents are then distributed to all 50 work centers.

In effect, the IBM cards are the focal point of the system. When the cards go out to the factory floor, they are prepunched and pre-printed with such basic order information as the estimated hours, estimated weight, work center and quantity of the order.

The first job for these cards is work scheduling. Foremen file them by work center and due date, using the printed information to help them plan the most efficient use of men and machines. The proper job card is pulled every time a worker is assigned a new task.

Ticking Them Off—As the op-



ON THE PLANT FLOOR: The system has resulted in more profitable use of labor from tapping right through to final machining of castings.

eration progresses, in and out times, clock number, number of pieces made and other data are recorded on it. The cards are returned to the IBM department daily.

The job cards can be put to many uses simply by feeding them into the proper IBM machines. For example, the original card is used for updating the work-in-progress inventory. A daily report is produced on the accounting machine which shows what is going on in every work center in the plant.

The same card also supplies the information for a report which shows the daily job status of each order. This report gives the number of pieces, hours per piece, number of pieces cast and other vital information.

Both of these reports, derived from the job cards, show the production manager where he stands on a current basis. He gets the information he needs without leaving his desk. Also, the information is a lot more detailed than anything he ever got before.

Added Value — While progress reports are being compiled, a duplicate version of the card is produced automatically on IBM equipment. It can be used to compile the weekly payroll.

After the payroll, the same cards are sorted down and used for a detailed report of direct and indirect labor. Foremen are provided with a copy of this report, and can use it to determine just what each man did the previous week.

In short, here is the kind of labor control that would be difficult, if not impossible, to exercise any other way. Without going to the trouble of a single extra clerical operation, the work center foremen now get a concise report on exactly how labor under their control is distributed.

At the start of our IBM system about 50 pct of our total labor hours were spent on direct work. Today we've been able to raise this figure to better than 60 pct or savings of many thousands of dollars a year.

MACHINE TALK: Once a series of cards is run off from the master, cards are processed through a card punch which, in effect, translates the order information into the required language of the machine.

PLAN AHEAD: Plant foremen use the punched cards from the data-processing system to plan work schedules for the crew. A weekly report tells each foreman just what his men accomplished the week before.

How Small Electrical Currents Reduce Salt-Water Corrosion

Electrical currents help to curb salt-water corrosion.

Recent tests also prove controlled currents can build up permanent corrosion guards.

■ Everyone knows salt water is highly corrosive. But corrosive or not, we've still got to live with it. Why not make the most of it?

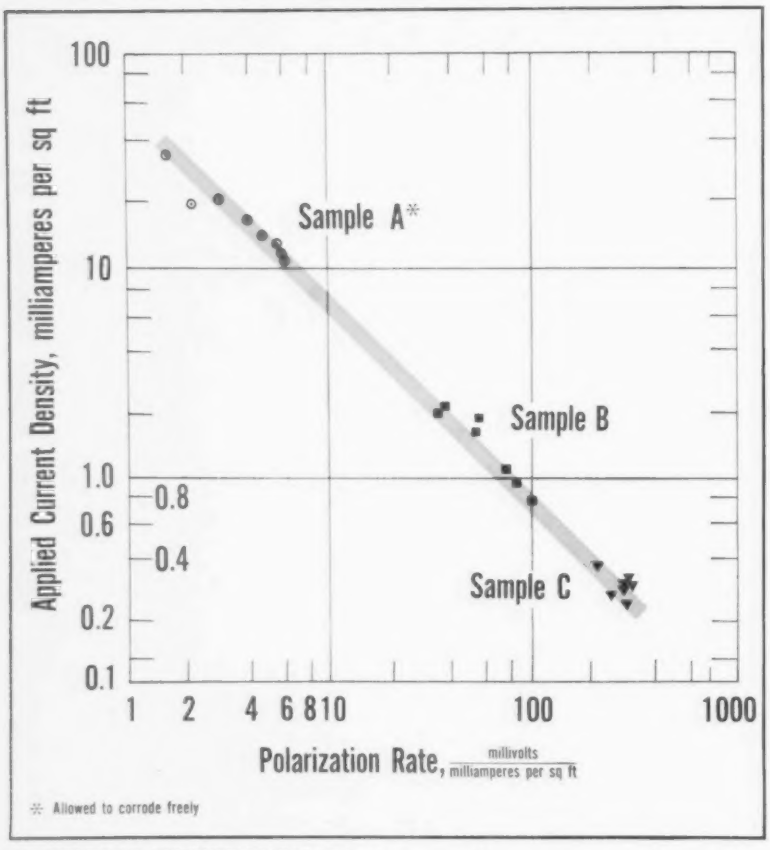
When iron or steel products contact salt water, an electrochemical phenomenon causes most of the corrosion. (IA—Aug. 4, '60, p. 107.) For this reason, cathodic protection is sometimes employed to prevent corrosive reactions.

Electrical Blockade—By passing a direct current from an auxiliary anode into a steel or iron part, you can block the ravages of corrosion. As the current flows onto the metal's surface, it prevents hydrogen ions from passing into solution. In solution, these ions trigger corrosive buildups.

A recent National Bureau of Standards study proves that coatings which form on steel—cathodically protected from salt-water corrosion — reduce the amount of applied current needed for protection.

This study was conducted by W. J. Schwerdtfeger of the NBS staff. He was assisted in the latter part of the work by Dr. R. J. Manuele, professor of chemistry at La Plata University, Argentina. Dr. Manuele is a guest worker at the Bureau.

Polarization Data Are Useful



CATHODIC PROTECTION: Direct current from a copper-oxide rectifier protected sample C. Calcium-carbonate coatings formed during the test.

Long-Time Tests—Here are the results of five-year exposure tests. Polarization measurements were made at the end of the program. These results show protection remains effective even though the current tumbles more than 200 fold.

What type of coatings are formed by cathodic protection? Spectrochemical analyses show these coatings consist mainly of calcium carbonate. Some silicates are also present.

As increments of current are applied, the potential changes. Recorded data on current-potential charts yield the rate of polarization.

Plot Optimum Flow—A "break" in a polarization curve marks the point where the applied current blocks most of the corrosive current.

In this NBS experiment, three rods of cold-rolled steel were exposed to tap water. Each rod measures 0.5 in. in diameter and 18 in. long. Mr. Schwerdtfeger added sodium chloride to the water. He used 3 pct NaCl by weight.

The test rods, suspended vertically in separate open jars, were protected from corrosion at the water line by plastic tapes. Each jar contained 17 liters of the saline solution.

Three Conditions—One sample was permitted to corrode freely.

Thus, it served as a control medium. Except for controlled interruptions near the end of the program, sample B was continuously protected by a sacrificial zinc anode.

A copper-oxide rectifier provided direct current to guard sample C. Of course, the water in the jars was kept at a fixed level, within the taped specimen areas, during the entire five-year period.

During the first months of exposure, a protective-current density of 5.0 milliamperes per sq ft guarded sample C. This was several times the current density of the zinc used with sample B.

Less Current—From the 33rd to the 57th month of exposure, the current density to sample C was progressively lowered. Reduction continued until the applied rectified voltage reached a value which held the sample's potential to about –0.77 v. The latter value was referenced to a saturated calomel electrode.

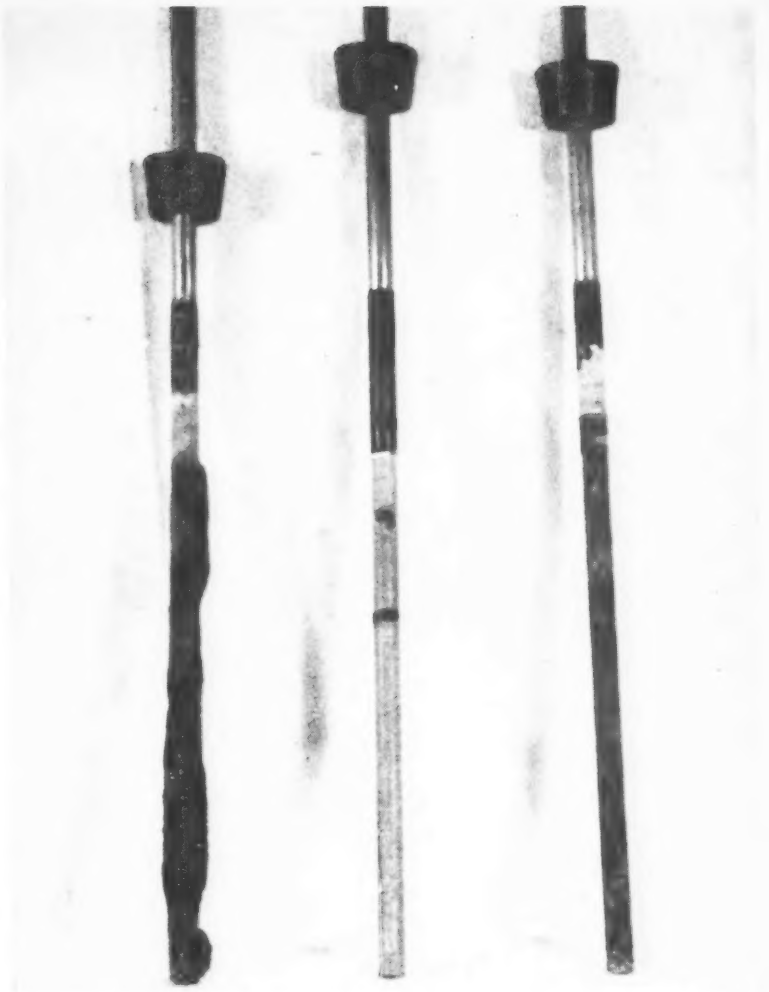
Eventually the current was held at 0.02 milliamperes per sq ft. This represents less than 0.5 pct of the initial current density used with test sample C.

At the end of 54 months, cathodic-polarization curves were obtained on all three test rods.

Protective Coatings—Very good protective coatings were formed on sample C. The superiority of these coatings to those formed on rod B is indicated by small current values at the break in the cathodic curve. Sample C's high polarization rates also prove out its superior coatings.

The spread in the data for sample B is due chiefly to increasing rates of corrosion. No doubt, the data spread was caused by scratches which were made in the coating. These scratches were purposely made toward the end of the exposure period.

Note the high corrosion rate of unprotected sample A. This corrosive buildup is indicated by large current values and low polarization rates.



TEST RODS: Three samples were immersed in a salt-water solution for five years. One of these steel rods (left) was allowed to corrode freely. A sacrificial zinc anode guarded the middle rod. Protective coatings on the third cold-rolled steel test rod were formed by a controlled current flow.

Anodic polarization curves were also obtained for all test rods. From both sets of curves, corrosive currents were calculated. Mr. Schwerdtfeger used these current values to compute theoretical weight losses.

Weight Losses — All computed values agree fairly well with actual weight-loss measurements. Each rod was carefully weighed after cleaning.

Sample A lost 11,835 mg of metal during the long exposure period. Sample C lost only 35 mg. And 12 mg of this total went into solution through pores in the coating during an unprotected period of 29 days.

The quality of sample C's coating was verified at the end of the test period. It's more compact and heavier than the coating on sample B. In addition, sample C's coating is more adherent.

Spectrochemical analyses checked out the coatings on both of the guarded samples. These coatings consist mainly of calcium carbonate. They also contain traces of some silicates.

Sample C's eventual superiority is attributed to the lowering of the protective potential to an optimum value of only –0.77 v.

Plant Painting Reaps Dividends

Modern industrial plants represent huge capital outlays. They deserve proper upkeep.

A well thought-out painting program prolongs the life of one company's equipment.

■ There's more to running an industrial paint shop than just slapping the paint from brush to wall. Proper inspection, work scheduling and standard methods are all vital elements in an efficient operation. So are testing, special equipment and many other critical skills.

The Timken Roller Bearing Co.'s maintenance men are well aware of this. They face the Herculean job of painting the equipment and buildings of a four-plant complex in and near Canton, Ohio. To do the job, they use more than 9000 gal of paint every year.

GOOD GLOW: Conventional spray equipment applies orange fluorescent coating on a fork-lift truck. Falling water filters the paint mist.

Lot's To Do—Nineteen, full-time painters take care of signs, building interiors, machinery, materials-handling units, locomotives and freight cars, and exterior painting. This upkeep requires a whopping yearly capital expenditure. It's imperative that the job be done efficiently.

Periodic inspection of the plant is an important first step. These checks point out exactly what areas need to be painted. Each year, for example, the Timken works engineering dept. sends its field men out to scan the interiors and exteriors of all plant buildings. They record all the defects. Then, maintenance dept. managers and key building-crafts supervisors get together.

They hash over the list to decide which jobs company painters should tackle, and which jobs ought to be placed with outside firms. Size of job, amount of work scheduled, and job completion date are important factors. These points control the choice between contracting the job or having it done by company men.

Thinking Ahead—Once the job list is shaped up, supervisors plan a schedule of jobs and list completion dates during the coming year. Such advance planning cuts confusion. The personnel involved, as well as company management, know what's to be done, when it's to be done and about what it will cost over the year.

Cost savings and convenience keynote this planning. By using standard methods, the company's painting program accomplishes both.

All offices within the plants are painted the same shade of grey. Machinery is painted light grey. However, the bottom part of each

SPRUCES UP THE PLANT: Timken painter employs airless paint-spraying equipment to brighten a factory wall. This painting method reduces spraying time.

ARTIST AT WORK: Skilled brush painting is an absolute necessity at Timken Co.'s bearing factories. Spray-painting fallout can ruin delicate bearings.

machine is the portion which takes the most punishment. It gets a second coat of a slightly darker hue.

All walls are standard light green. Here again, lower walls are painted a darker color because they receive more abuse. This tends to conceal scars or markings.

Glow Promotes Safety — Safety gets its share of attention too. All materials - handling vehicles glow with a blaze-orange color. Daylight fluorescent paint is responsible. It easily attracts the eye of walking workers. As a result, fewer employees are clobbered by lift trucks.

Before standard painting was adopted, plant department heads exercised their individual taste. Esthetically, this may have been gratifying, but it left a lot to be desired cost-wise. Now, as a result of standardization, the company can buy larger quantities of the same color. This cuts paint inventory. It also saves paint matching time.

Tests Cut Costs—Durability testing is another important aspect of the painting program. Various types of paints are tested before use. Object is to select the one that lasts longest and holds its color the best. This really pays off for painted areas exposed to heavy traffic. Proper testing slashes costs and frequency of painting.

Skill of the painter and his use of the best available equipment are also vital for good results. Top-notch brush painting is particularly important at Timken's Canton and Gambrinus bearing factories.

Paint fallout rules out the new airless-painting methods. Even tiny particles falling on unfinished products could be disastrous. Soft spots might develop on the end product.

Steel Mills Get Spray—However, conventional spray units are used in many other areas. In the company's steel mills, airless painting speeds upkeep work. It also provides a more uniform coating thickness.

Paint is atomized by forcing it through an orifice under high fluid pressure. The orifice, viscosity and fluid pressure are all controlled simultaneously. This method dispenses with the spray booth.

Timken's program serves three important functions. Painting guards the company's sizable capital investment in plant. True, the cost of a painting program is not to be sneezed at. But it's usually not as expensive as replacing equipment. Painting also brightens the atmosphere for employees. Thirdly, it's a prerequisite for plant cleanliness.

Automatic Semi-Tubular Riveting Reduces Assembly Costs

By **W. R. Burkhart**—Supt. of Mfg. and **P. R. Lee**—Mgr. of Controls Engineering, Consumer Products Div., Westinghouse Electric Corp., Mansfield, O.

Special teams at Westinghouse have their eyes focused on areas where costs can be cut.

Here's an example of what one team did to improve hand-riveted electrical controls.

▪ A company-wide cost and expense reduction program has produced significant gains in many phases of manufacturing home appliances.

Fourteen inter-departmental teams proposed and carried out changes in product design and manufacturing methods. The result: Lower cost with equal or better quality.

Key department representatives on each team include production, methods, quality control, tool engineering, product engineering, sales and production control. Their job is to evaluate new methods and make them work, against severe standards on the amount of cost decrease and return on capital investment.

Check the Records—One team successfully reduced assembly costs for small electrical controls. This project, which evolved from methods studies, began more than five years ago.

The goal was to lower the in-place cost of riveting two control devices for electric ranges, an infinite switch for surface units and an oven-heat control.

Both the switch and oven control have been assembled for many years by riveting electrical parts to the molded phenolic cases of the units.

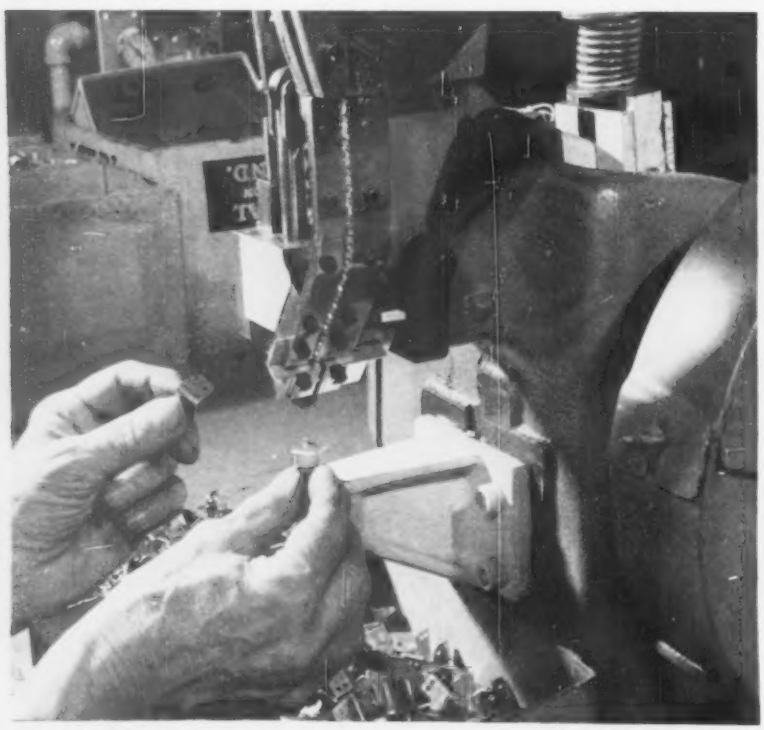
The team stepped in and changed hand operations with solid rivets to automatic setting of semi-tubular rivets. Original cost analysis showed that 81 pct of the investment in semi-tubular riveting machines would be returned in lower fastening costs in the first year.

Takes Hold — Today, automatic semi-tubular riveting machines assemble the infinite switch. Before this, the production line consisted of speed hammers and air squeezers for solid rivets. These rivets were picked up and inserted by hand.

It was known that automatic semi-tubular riveting was inherently faster and could greatly reduce labor cost. However, many riveting specialists felt that the semi-tubular rivets were too small to set properly in large-volume production runs.

A ceramic insulator in the infinite switch presented the most difficult riveting problem. Although the part is only 3/32 in. thick at the location of the rivet hole, the length tolerance through the hole is ± 0.007 in.

To avoid fracture of parts on the high-tolerance side at impact of the rivet driver, it would have been necessary to specify the semi-tubular rivet length to set properly in the longest hole. However, the fastening would then be too loose when the part thickness is on the low-tolerance side.



QUICK RETURN: Cost sheets show that 81 pct of the original investment in semi-tubular riveting machines is returned the first year.

New Techniques Cut Assembly Time In Half

Components Riveted in Assembly Operation	Number of Rivets	Assembly Hours* per Unit		Reduction in Assembly Hours, Pct
		Previous Method with Solid Rivets	Automatic Semi-Tubular Riveting	
Differential Bimetal Assembly to Insulator	1	0.00378	0.00231	39
Adjusting Arm to Bimetal-Heater Assembly	2	0.00900	0.00298	67
Contact Spring and Line Terminal to Base	4	0.02154	0.00950	56
Contact Spring and Heater Assembly to Base	2	0.00965	0.00370	62
Line Terminal to Differential Bimetal Assembly	2	0.00532	0.00138	74
Line Terminal to Spring	1	0.00312	0.00115	62
Totals		0.06430	0.02536	61

* Includes picking up components, placing together, positioning on riveting fixture, rivet-setting, removal of assembly to box.

Proposes Solution — Application engineers at The Milford Rivet & Machine Co., Milford, Conn., proposed that the riveting machine be provided with a spring-loaded connecting rod. This would compensate for the unusually wide variations in the thickness of the ceramic part. Test runs proved successful.

Once acceptable, assemblies were obtained with the proper semi-tubular rivets and machines. Uniform fastening quality was achieved because the machines establish rivet-setting pressure automatically.

To avoid possible part rejections, which might occur due to wear on the semi-tubular riveting roll sets, an automatic replacement sequence has been established for roll sets. Depending on the particular rivet-setting operation, roll sets are changed about every 100,000 operations.

Breakdown—The table provides a step-by-step breakdown of riveting operations in assembling the infinite switch. The assigned assembly hours per unit are given for both solid rivets and for semi-tubular rivets for each riveting operation and in summary for the total assembly.

The reduction in assembly hours naturally varies quite widely since a proportionately greater amount of time is used for rivets which are hard to install manually.

The 61 pct overall reduction in assembly hours results in a labor savings of between 0.3-0.5 cents per in-place rivet (difference in rivet cost is negligible).

Therefore, semi-tubular riveting provides a reduction of about 5 cents in the works-delivery cost (direct labor plus assigned overhead) per infinite switch.

Silver Tip — Semi-tubular silver contact rivets led to additional savings on oven controls.

LOOKING AHEAD: To avoid possible part rejections, roll sets are changed on all riveting machines after about 100,000 operations.

Forgers Tame Tungsten Alloys

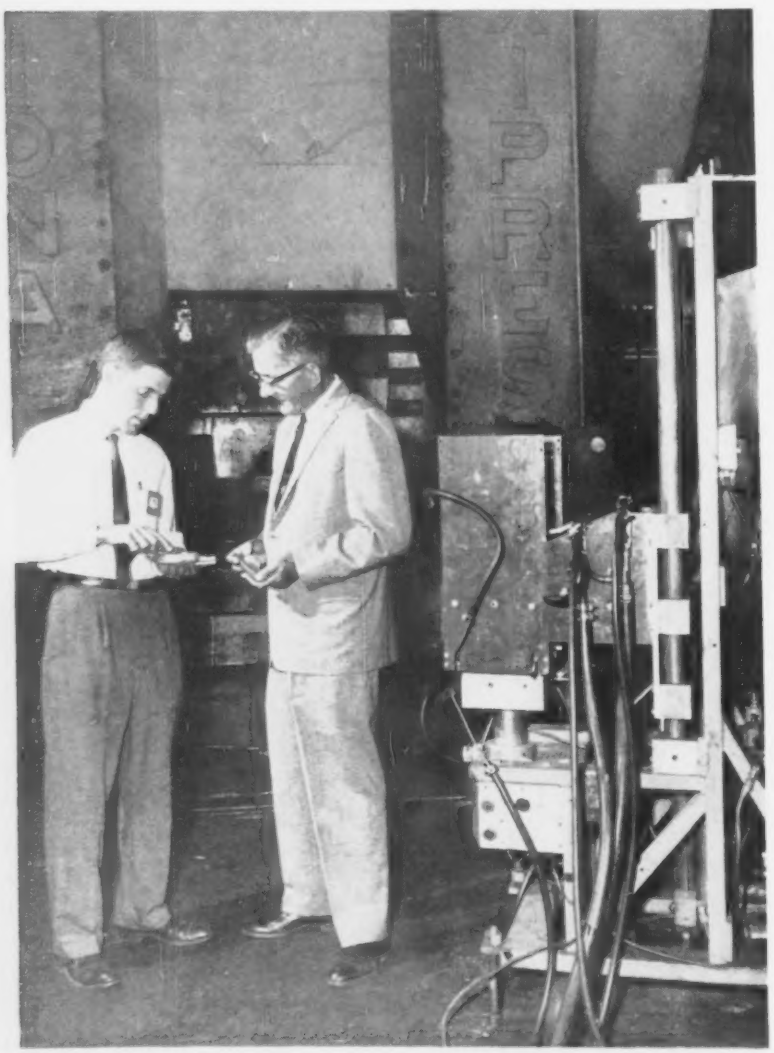
A big step has been taken to make a more exact science of the forging and processing of refractory metals.

Alloys can now be forged into thin structural shapes.

■ A new process has been developed where tough tungsten alloys which melt above 6000°F can be forged into thin structural shapes. So far, these forgings are available only in prototype quantities. Nevertheless, the development is expected to result in big savings on a U.S. Air Force contract.

The forgings represent fine precision. Tolerances include web and rib thickness of 0.130 in. plus or minus 0.015 in., surface finish of 30 rms, and draft angles as low as one degree.

Work was carried out by Tapco, a division of Thompson Ramo Wooldridge Inc., Cleveland, under the sponsorship of the Manufacturing Technology Laboratory, Wright-Patterson Air Force Base.



SPECIAL DESIGN: To forge the thin, structural shapes from tungsten alloys, a special furnace had to be designed to heat the bar stock.

New Equipment—A specially-designed 700-ton press was built for the project. The press can handle the difficult-to-form metals at high speeds and high pressure. Tapco is able to extrude tungsten alloy ingots in the press at temperatures up to 4000°F.

No equipment could be found that would generate such temperatures without contaminating the ingots, so Tapco designed and built the needed furnaces. A vacuum is drawn on the furnace to purge the air. High-purity argon is used to protect the ingot during heating.

Engineers also developed special coatings which were applied on the extrusion dies. The coatings prevent the hot ingot from melting the dies.

The bar stock was forged in only three steps in the Tapco Forge Shops. Careful control of metal flow patterns, temperatures and lubricants enabled commercial die steels to withstand the repeated blows dealt the extremely tough metals.

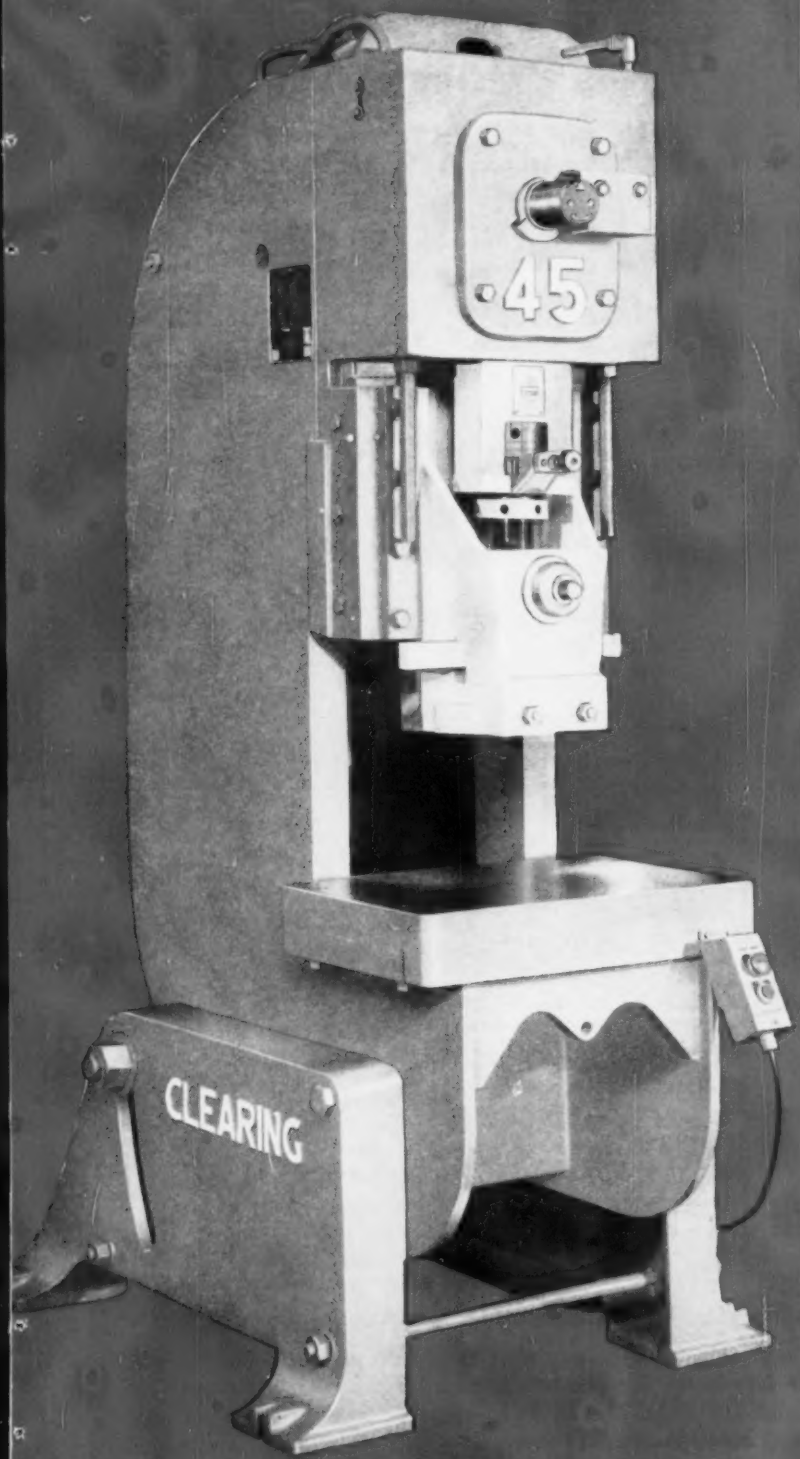
Actual Results—Mechanical property and metallographic studies were run. Special furnaces, capable of heating to 4000°F in vacuum of 10^{-6} mm, were used to measure tensile strength and stress rupture life. The tensile strength was 38,200 psi at 3000°F, while the latter ended up at 32.5 hours at 15,000 psi.

Ingots, extruded bar stock and finished forgings were subjected to thorough ultrasonic inspection, chemical analysis and many mechanical tests throughout the program.

Tungsten ingot producers are now reported to be devoting more effort toward the production of wrought starting stock.

The success of this program should permit forging suppliers to make rapid advances in meeting USAF requirements.

Here is why your next O.B.I. should be a Clearing



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A fine adjustment setting for unusually accurate slide positioning has been newly designed. Adjustment also contains a lock which holds the slide rigidly at the desired setting.

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Your Clearing O.B.I. will have operator's control buttons and master control panel, wired-in and in place when shipped. Five position selector switch is key-locked.

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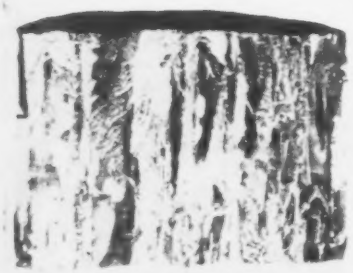
New Materials and Components



Production Process Aligns Ferromagnetic Crystals

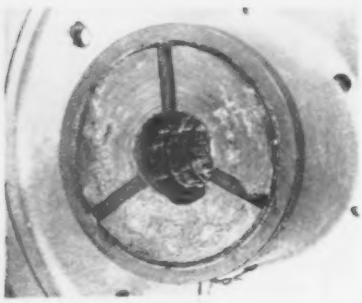
Here's an important breakthrough in the manufacture of permanent magnets. It's a magnetic material which yields a nominal-energy product of 7.5-million gauss-oersteds with alloys of Alnico composition. Key to the development is a process which permits 100 pct grain orientation throughout the entire cross section of magnet castings. In other words, straight-line "highways" for magnetic forces are created in the material. This method actually elongates the casting's magnetic crystals. It aligns the corresponding atomic structure in a single direction which conforms to the desired magnetic orientation. (U. S. Magnet & Alloy Corp.)

For more data circle No. 20 on postcard, p. 131

Simple Solution Solves a "Sticky" Situation

Sometimes a little imagination will eliminate a messy job. For instance, handling tooling resins has always been messy, costly and time consuming. Inevitably, spillage occurred in moving resin from the large container to a smaller dispenser. To eliminate this gooey waste, all you need is a tank with 1½ times the capacity, and a ½-in. larger diam than a 10-gal resin container. Midway in the tank, mount a platform on a pipe which extends about 2 in. above the platform. The upper end of the pipe should be sliced off at an angle, leaving a sharp point. With this arrangement, you simply drop a 10-gal resin container into the tank. The pipe pierces a hole, and resin flows into the tank. (The Martin Co.)

For more data circle No. 21 on postcard, p. 131



Carbon-Graphite Bearings "Beat the Heat"

Motor bearings that take temperatures up to 870°F, without external cooling or lubricant, are a tall order to begin with. When they must also handle an output torque of 3 in. lb, a 3-lb thrust load and a 10-lb radial load they're really a poser. However, special bearings meet these specs. Three-piece design and a tough carbon-graphite material were the winning combination. The carbon graphite has a low friction coefficient, high-wear resistance and stability. To overcome its low-tensile strength, the bearings are kept in compression. (The United States Graphite Co.)

For more data circle No. 22 on postcard, p. 131

Rigid-Plastic Pipe Conducts Corrosive-Liquid Flow

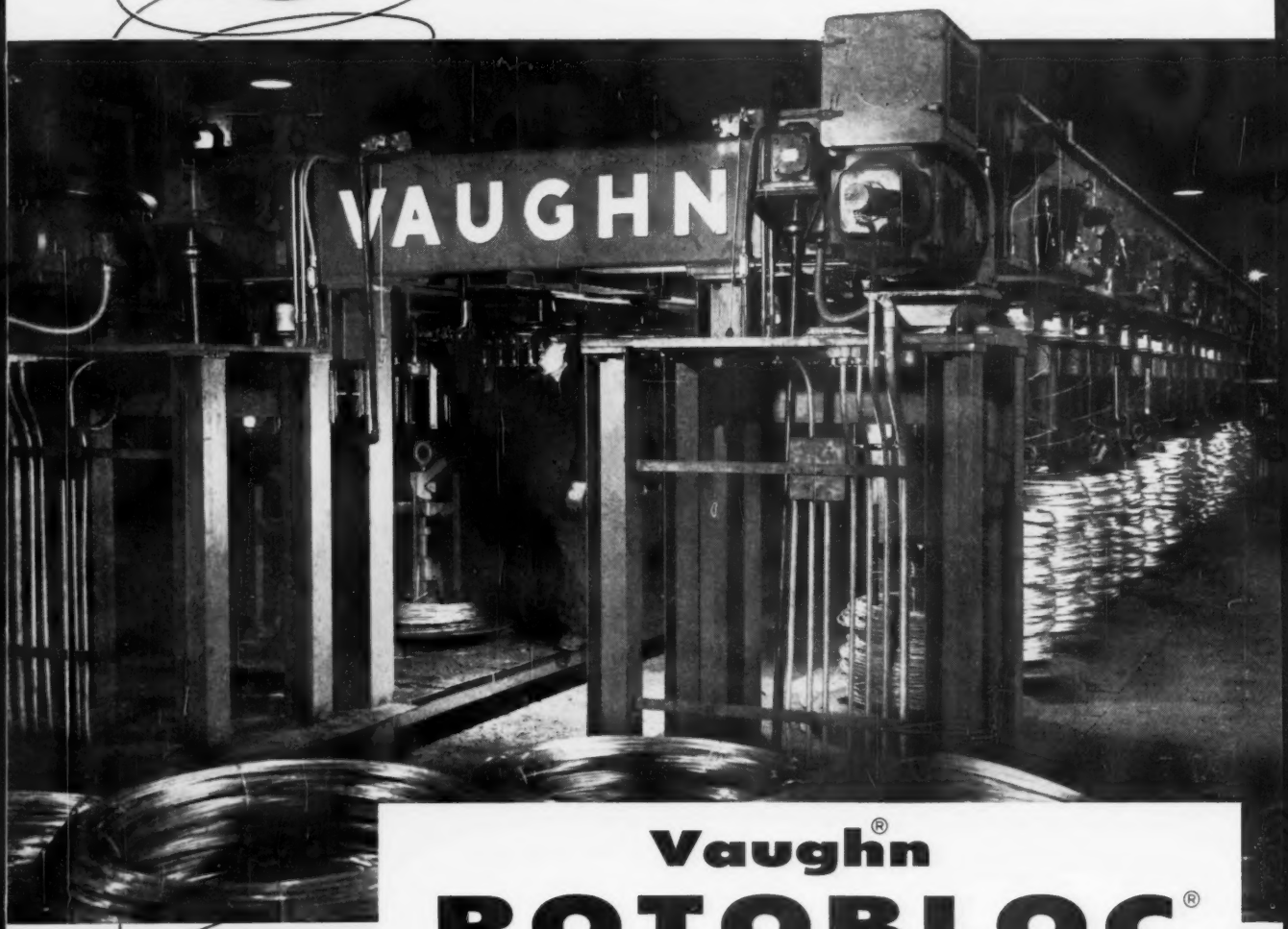
Now in production, 10-ft lengths of epoxy pipe come in diameters ranging from 1½-12 in. This rigid-plastic pipe is composed of a thermo-setting resin, reinforced with a non-wicking inert filler. An unusual fabrication process results in a glass-smooth bore and an extremely-uniform wall thickness. Because the product is designed primarily for handling corrosive liquids, its inherent physical properties make it practical for the electrical, communications, oil and textile industries. (Resisto Chemical, Inc.)

For more data circle No. 23 on postcard, p. 131

Large bundle–non-stop operation

without twist!

FOR USS AT DONORA WORKS, AMERICAN STEEL AND WIRE DIVISION



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Alloy Foundries Division, The Eastern Co., Naugatuck

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Chicago Malleable Castings Co., Chicago 43
Moline Iron Works, Moline
Moline Malleable Iron Co., St. Charles
National Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division, The Eastern Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
National Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

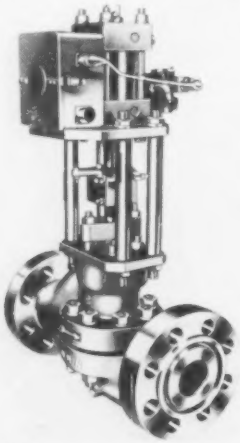
WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council

DESIGN DIGEST

Actuates on Signal

Custom designed for the job, a new actuator converts a suitable electrical signal, from an automatic or manual-electrical control station, into a powerful hydraulic force. It responds to minute changes in these electrical signals. Then it delivers large instantaneous thrust. Even so, it remains inherently stable under adverse operating conditions. Major components consist of: Transistorized amplifier with plug-in circuits, feedback potentiometer, hydraulic servovalve, and heavy-duty power cylinder. Servovalve and cylinder



are sized to provide the correct thrust and frequency response for a specific use. (The Annin Co.)

For more data circle No. 24 on postcard, p. 131

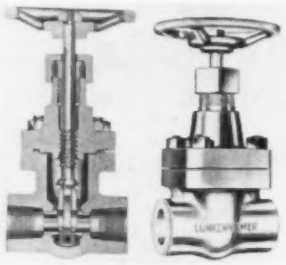
Four-way Valves

Rated at operating pressures to 5000 psi, a new 1½ in., 4-way valve operates by manual, mechanical or electrical means. The unit comes with thread, subplate or flange connections. Five different spools provide for open, closed or partially - blocked, flow - path connections. These connections handle flows up to 90 gpm. (Denison Engineering Div., American Brake Shoe Co.)

For more data circle No. 25 on postcard, p. 131

Fits in Tight Spots

An inside-screw, small-steel gate valve is newly-designed and compactly-made for fast installation in a limited space. In operation, an accurately-machined, solid-wedge disk



is guided to a firm seat without dragging across the seat rings. Disks are chrome-stainless steel that's heat treated all the way through. This eliminates chipping or cracking. (Lunkenheimer Co.)

For more data circle No. 26 on postcard, p. 131

Versatile Index Tables

According to the manufacturer, the design simplicity of these index tables provides great savings. In the first place, initial cost is low. Secondly, long life results from high-quality construction. In continuous operation, the index motion equals the locking or work-cycle time. However any requirements can be obtained. Index time, with slow start and slow stop, can be as brief as ⅓ of a second. But here again, it may be designed to meet any required-time factor. In addition,

there's absolutely positive locking, and never any backlash. Both the turning motion and the locking are entirely mechanical. (Jackson Fluid Power Co.)

For more data circle No. 27 on postcard, p. 131

Vane-Type Motors

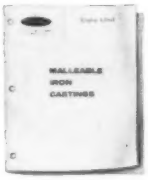
Five models come in a new line of vane-type fluid motors. Speeds range up to 2000 rpm, and pressures go as high as 2000 psi. The

Malleable Puts More Muscle in Machinery

In the agricultural equipment field, reputations depend on building products that can take rough treatment . . . and give real value. To do it, agricultural equipment manufacturers rely heavily on Malleable iron castings.

Malleable's excellent ductility and shock resistance mean longer life and fewer problems than obtainable with fabrications. Low start-up cost for small quantities also is vitally important in this competitive industry.

Put more reputation-building quality into your products at less cost with Malleable. For design assistance or quotations, call any company that displays this symbol —



PROBLEM-SOLVING IDEAS are yours free in Data Unit No. 115. For your copy, ask any member of the Malleable Castings Council, or write to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

MEMBER
MALLEABLE
CASTINGS COUNCIL

The versatility of Malleable castings is reflected in the variety of ferritic and pearlitic Malleable tractor parts, from the tough, dependable front axle bar to bolsters, lift arms, clamps, clevises, hitches, hinges, foot pedals, transmission planetary carriers and clutch parts.

Vertical pit-type carburizing furnace (9' x 24') lined with a refractory insulating castable made with LUMNITE cement. Furnace temperature 1800°F. Badall Engineering & Manufacturing Co., Hammond, Ind. Castable used: "Kast-O-Lite," product of A. P. Green Fire Brick Co., Mexico, Mo.

How to reduce furnace heat loss

Refractory insulating concrete, made with LUMNITE calcium-aluminate cement, is being specified for linings in many types of industrial furnaces. It helps trim fuel costs by reducing heat loss and increasing heat storage. This helps shorten heating-cooling cycles and provides closer temperature control. In addition, the smooth, jointless concrete surface reduces air infiltration.

Construction with refractory concrete is fast, easy, economical. Linings can be cast in place, troweled or "gunited." Service strength is reached in 24 hours.

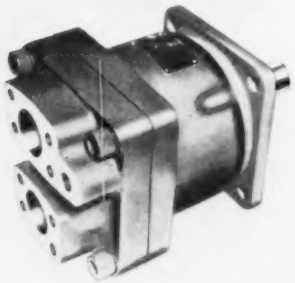
For convenience, manufacturers of refractories offer castables bonded with LUMNITE cement – packaged mixtures ready for use with just the addition of water. For more information, write Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

"USS," "Atlas" and "Lumnite" are registered trademarks L-193

Universal Atlas Cement
Division of
United States Steel

OFFICES: Albany • Birmingham • Boston • Chicago • Dayton • Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • St. Louis • Waco

five produce maximum torques of 1249, 1719, 1897, 2160 and 2345 in. lb, respectively, at 2000 psi. One

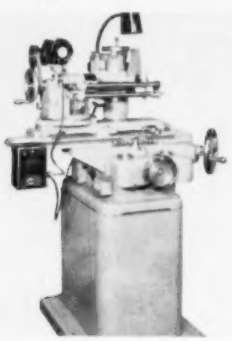


outstanding feature is floating-port plate construction, with a built-in shuttle valve. This keeps the plate under constant uniform pressure, regardless of the flow through the motor. The port plate exerts necessary clamping force on the cartridge. At idle, a light spring provides clamping force. However, the floating port plate minimizes wear and eases starting at any temperature. (The Denison Engineering Div., The American Brake Shoe Co.)

For more data circle No. 28 on postcard, p. 131

Two-Way Fixture

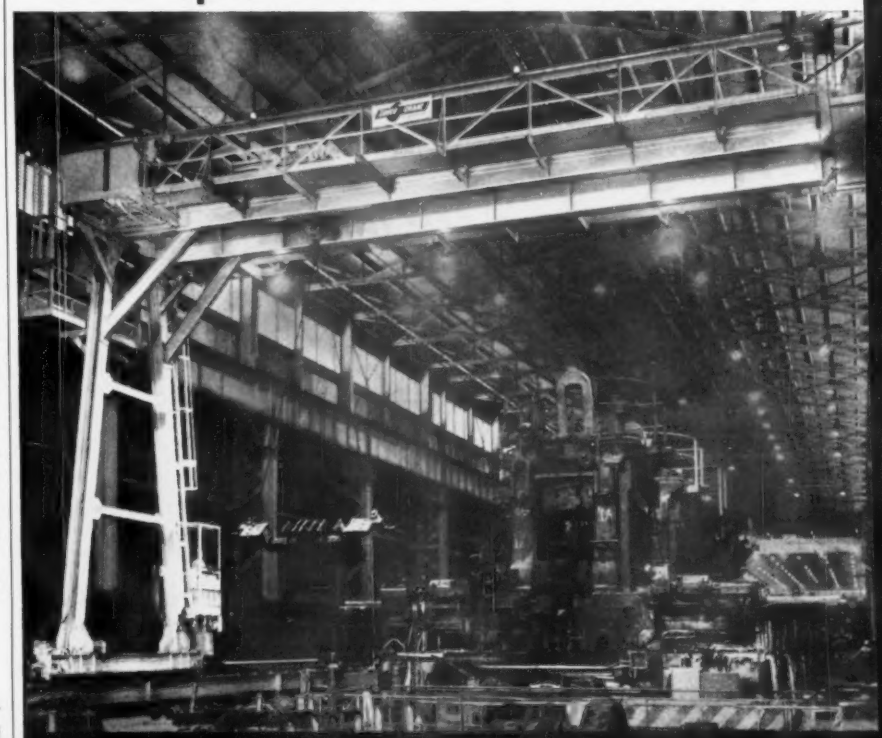
Here's a universal, two-way relieving fixture for use with tool and cutter grinders. According to the manufacturer, the new fixture promotes highly-accurate tool sharp-



ening at low cost. It also ups tool life. Either hand- or motor-operated, the unit comes with a swivel index base, a rectangular base or an extended base with outboard bearing and tail stock. Fast, easy, setups result from the use of dial

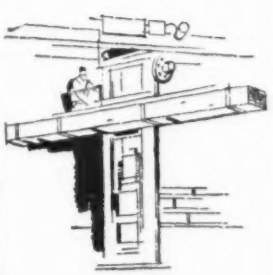
CONCO
OVERHEAD
TRAVELING
CRANES

in capacities to 150 tons



Conco Semi-Gantry Crane
custom-engineered for service
in a Chicago area steel mill

CRANES HOISTS CONCO



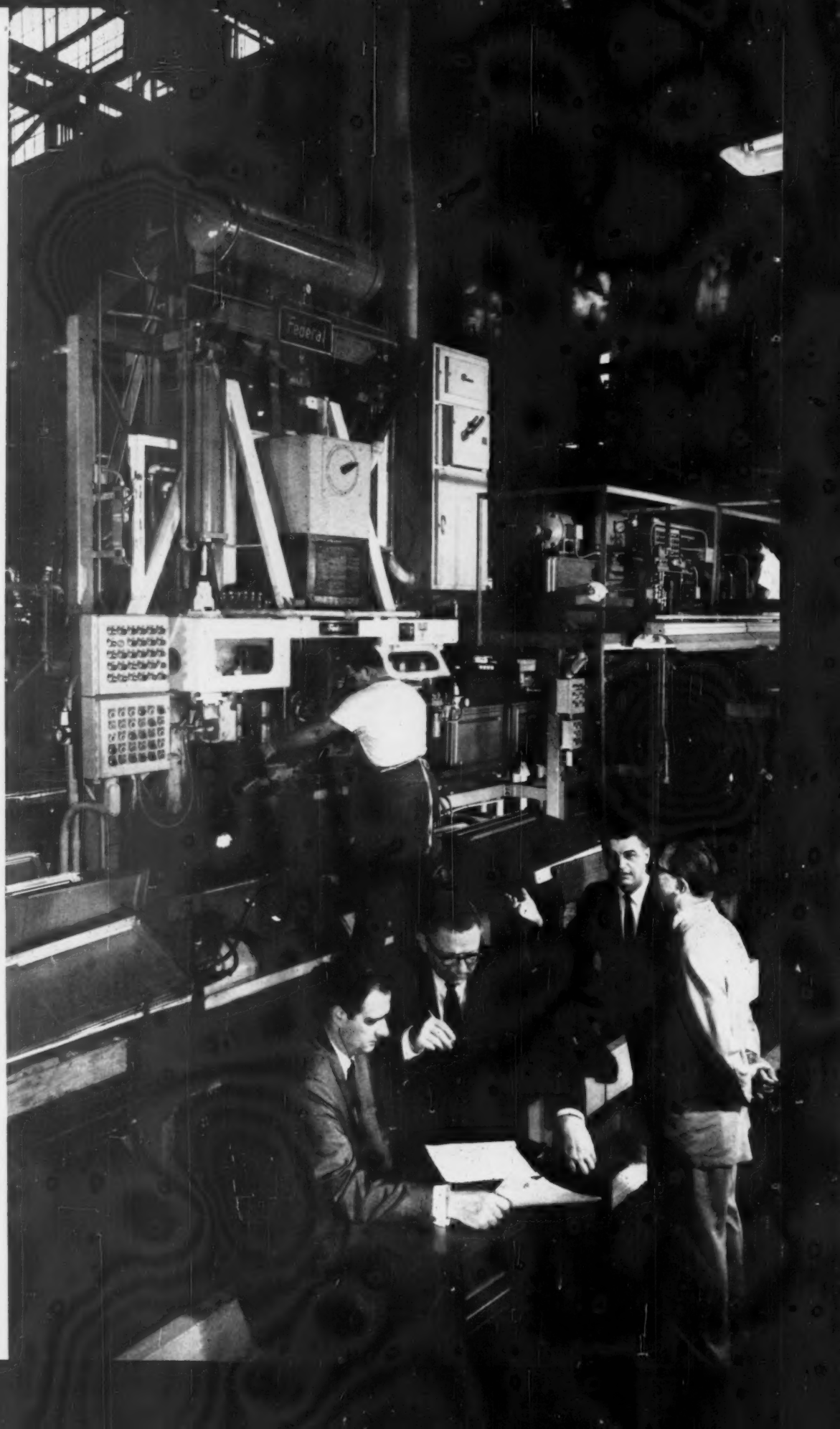
Write for Crane Specifications Tablet containing five sets of general service crane specification data and forms.

For information on Conco Cranes, Hoists and Trolleys Request Bulletin 5000B

Material Handling Division
CONCO ENGINEERING WORKS, INC.
Mendota, Illinois

AFFILIATES:
SPARTAN TOOL DIVISION, Powered Sewer Cleaning Equipment
FIELD CONTROL DIVISION, Barometric Draft Controls
CONCO BUILDING PRODUCTS, INC., Brick, Tile, Stone.

CHICAGO TRAMRAIL, manufacturer of "Trak-Rak" Stacker Cranes, Monorail Systems, and "Fas-Lok" Storage Racks at 1330 S. Kostner Ave., Chicago, is now a DIVISION OF CONCO ENGINEERING WORKS, INC.

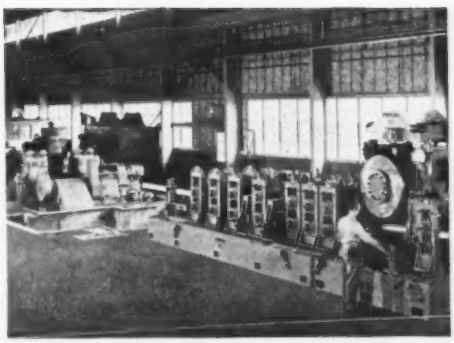


Federal Welding Line at Whirlpool's Evansville, Indiana, refrigerator plant automatically forms and welds together complete food liner shells at a rate of 200 per hour. Here, F. A. Bodenheim, Jr., manager of welder sales for McKay's Federal-Warco Division, goes over latest production charts with H. J. Muehlhauer, director of manufacturing engineering for Whirlpool, as Robert Russell, sales representative for Federal-Warco, discusses operations with Gene Rommel, general superintendent of tooling for Whirlpool.

Photo by ARNOLD NEWMAN

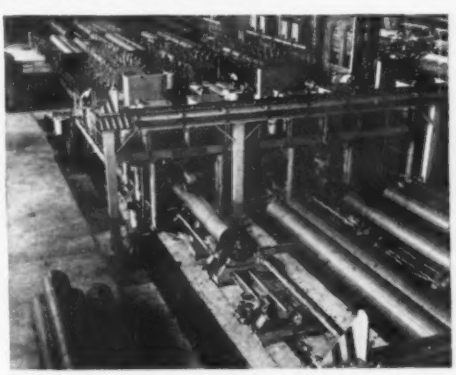
A completely integrated plant . . . a single source of supply . . . one area of responsibility! A new idea? Not really, but an idea that's not easy to bring to reality. McKay Machine has done it for metal fabricators, designing and building equipment to volume produce parts or entire units from raw steel to finished product. ***This is McKay Machine*** We know steel handling . . . we've been designing uncoilers and coil-handling equipment for 30 years. McKay Machine knows welding because the highly respected names of Federal Welder and Berkeley-Davis are now a part of our company. We know processing and forming . . . McKay levelers, tube mills, and cold roll forming machines have been specified by leading industrial firms for more than two decades. And McKay Machine knows stamping, as the Warco Press name testifies. McKay builds the industry's most popular shearing and slitting equipment. Only McKay Machine designs and builds all the components for a truly integrated production line. If you are one of the hundreds of manufacturers who must shave production and handling costs to successfully compete, McKay Machine should interest you. If we do, let us know and we'll meet with you at your convenience. *The McKay Machine Company, Youngstown 1, Ohio.*

McKAY MACHINE



McKay Tube Mills and roll forming machines are considered among the best engineered in the world.

Warco Presses can be found in the leading automotive, appliance and aircraft plants . . . wherever stamping is a major operation.



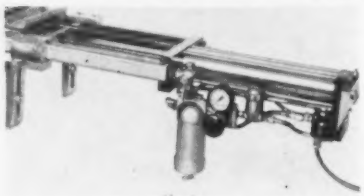
Berkeley-Davis Fusion Welding Lines, such as the huge installation above, are used by an ever-increasing number of leading steel fabricators.

indicators that pre-set the amount of relief required. The intersection of diameters and shoulders is not undercut. It's also easy to change cams mounted on the fixture spindle. (Henry P. Boggis Co.)

For more data circle No. 29 on postcard, p. 131

Converts Punch Press

Here's a new unit that profitably converts punch-press, press-brake and square-shear jobs to high-speed automatic feed. According to the manufacturer, even short-run work



can pay off. The newcomer is an air-operated portable coil and strip-feed unit, for use on any hand-fed punch press. It feeds strokes up to 12 in., with speeds up to 350 strokes per minute. This rate applies to stock widths up to 24 in. in light-gage material. In narrower widths, it handles up to 11-gage stock. Extremely versatile, the unit readily transfers from one machine to another. This takes no more time than is required for die setting or removal. Set-up is quick and easy. (Power Control Products, Inc.)

For more data circle No. 30 on postcard, p. 131

HOW TO SAVE
$17,360 per year
ULTRASONICALLY

An experimental installation for removal of residual smudge from shot blasted strip by means of ultrasonics. A joint project of Pangborn Corp., Wean Engineering Co., Inc., and Branson Instruments, Inc.

The shotblast method of descaling strip is becoming more and more popular, especially among the lower tonnage producers, converters and fabricators. In this process, hot bands are descaled in a blast cabinet with abrasive shot.-Today ultrasonic cleaning is on the way to replacing flash pickling. This method, which eliminates stream pollution and acid disposal, offers many extras:

• LOW INITIAL INVESTMENT (for tanks due to inexpensive steel construction) • LOW MAINTENANCE COSTS • LOW OPERATING COSTS (in terms of heat and power input) • REDUCED OPERATING TEMPERATURES • LITTLE OR NO CORROSION • NO FUME REMOVAL • NO ACID DISPOSAL • SPACE SAVING (ultrasonic installations are shorter in length).

Branson's highly experienced, factory trained specialists stand ready to assist you anywhere in the U. S. Tell us about your particular problem and Branson's enginering department shall try to find the best possible solution in the shortest possible time.

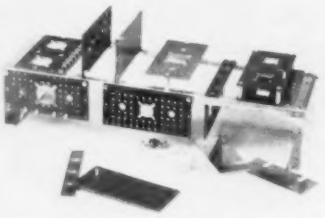
SINCE 1946 — THE RESPECTED NAME IN ULTRASONICS

BRANSON INSTRUMENTS, INC.

Ultrasonic Power Division
23 Brown House Road, Stamford, Conn.

Breadboarding Kit

Here's a construction set that provides a convenient basis for assembling experimental models of

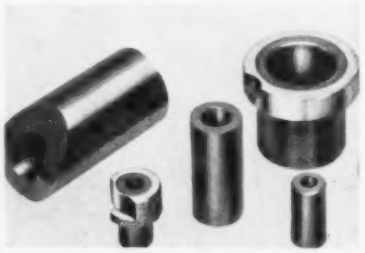


electronic equipment. It lets the designer complete his prototypes without using any tools except a soldering iron. To do this, the kit contains an assortment of prepunched phenolic panels, terminal strips, volume-controlled strips, snap-in turret terminals, punched-chassis frames, end plates, rack-mounting plates and assorted hardware. The slotted terminals push into the panels. Once inserted, they hold securely without turning. (Precision Metal Products Co.)

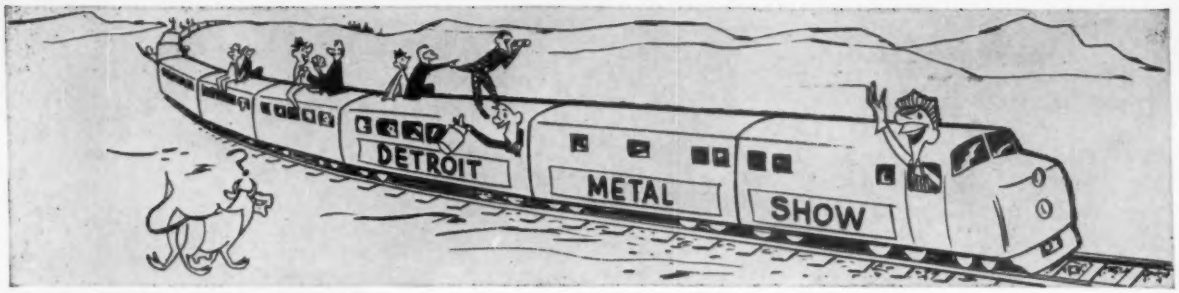
For more data circle No. 31 on postcard, p. 131

Carbide Bushings

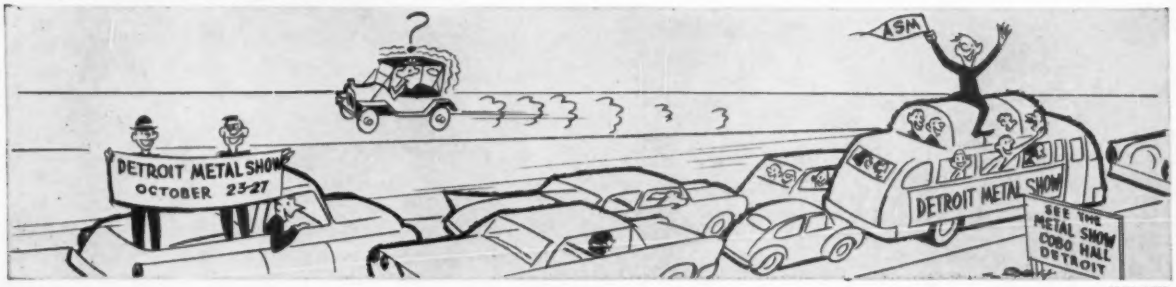
Carbide bushings are now available along with other bushing prod-



ucts in a line. Although tungsten-carbide bushings cost more than



EVERYONE...



10405-ASM

(Well, almost everyone)...

is headed for the 1961 DETROIT METAL SHOW

THE WORLD'S MOST COMPREHENSIVE METALS AND PROCESSING EVENT

OCTOBER 23RD THROUGH 27TH • COBO HALL

Ideas . . . Ideas . . . Ideas . . . stimulating, thought-provoking ideas. How to improve production . . . how to cut costs . . . how to stay ahead of competition. SEE – hundreds of educational exhibits. HEAR – presentation of over 200 technical papers. EXAMINE – processing, inspection and control equipment. VISIT – the spectacular Materials Comparison Center. Yes, *everyone* . . . especially the IDEA man for his company . . . is headed for the 1961 Detroit Metal Show. He wants to *KNOW* more . . . DO YOU?

PLAN NOW TO ATTEND THIS GREAT SHOW!

ORGANIZE A COMPANY GROUP FOR TRAVEL AND ACCOMMODATION ECONOMY!

USE THIS CONVENIENT ADVANCE SHOW REGISTRATION FORM! You will receive your ASM INFORMA-Badge, your credit card guest permit to the show.

Advance Registration Manager, ASM Headquarters, Metals Park, Ohio
Gentlemen: Please register myself (and the names of my associates listed below) for the forthcoming METAL SHOW at Cobo Hall in Detroit.

Name	Title	Indicate Affiliated Organization*	Registration Fee for ASM Sessions and Exposition: $2.00. (Except as noted below)

(Enclose check or money order) TOTAL

Company _____

Address _____

City _____ Zone _____ State _____

☐ ASM Members: NO REGISTRATION FEE for ASM Sessions and Exposition.
☐ AIME Members: $5.00 Registration fee includes AIME sessions, ASM sessions and Exposition;
☐ non-members: $10.00 AIME sessions, ASM sessions and Exposition.
☐ SNT Members: $5.00 Registration fee includes SNT sessions, ASM sessions and Exposition;
☐ non-members $7.00 SNT sessions, ASM sessions and Exposition.

MEEHANITE MEANS BETTER CASTINGS®

Presents Engineering Data Important To Gear Users

In the design of a gear, the most important single factor is the correct choice of material since it controls the overall dimensions, the degree of accuracy and finish and performance.

This new 16-page brochure presents the essential facts and performance figures on several types of Meehanite metal that are highly recommended and used for a wide range of gear applications. It explains how Meehanite meets important gear requirements and why industry is utilizing more and more Meehanite gears to increase service life and reduce down-time and costs.

Meehanite metal provides a unique combination of properties. Its inherent advantages of high strength with low co-efficient of friction, excellent noise damping capacity, free machinability and resistance to wear and surface fatigue failure contribute greatly to gear accuracy and service reliability.

For your free copy of this informative brochure, write to the Meehanite Metal Corp., New Rochelle, N. Y. Ask for B-53-Meehanite Gears serve industry . . . better.

MEEHANITE METAL

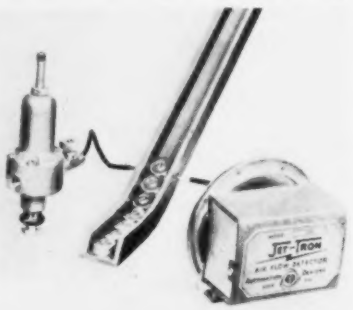
MEEHANITE CASTINGS ARE MADE ONLY BY MEEHANITE FOUNDRIES.

standard bushings, they pay off in many applications. Decreased machinery downtime, for changing bushings on high-production runs, makes up the difference. Also, where bushings are subject to extreme wear, such as in drilling angular holes, carbide bushings give accurate hole location over a longer period of time. Longer drill life is still another important advantage. (Ex-Cell-O Corp.)

For more data circle No. 32 on postcard, p. 131

Warns of Intruder

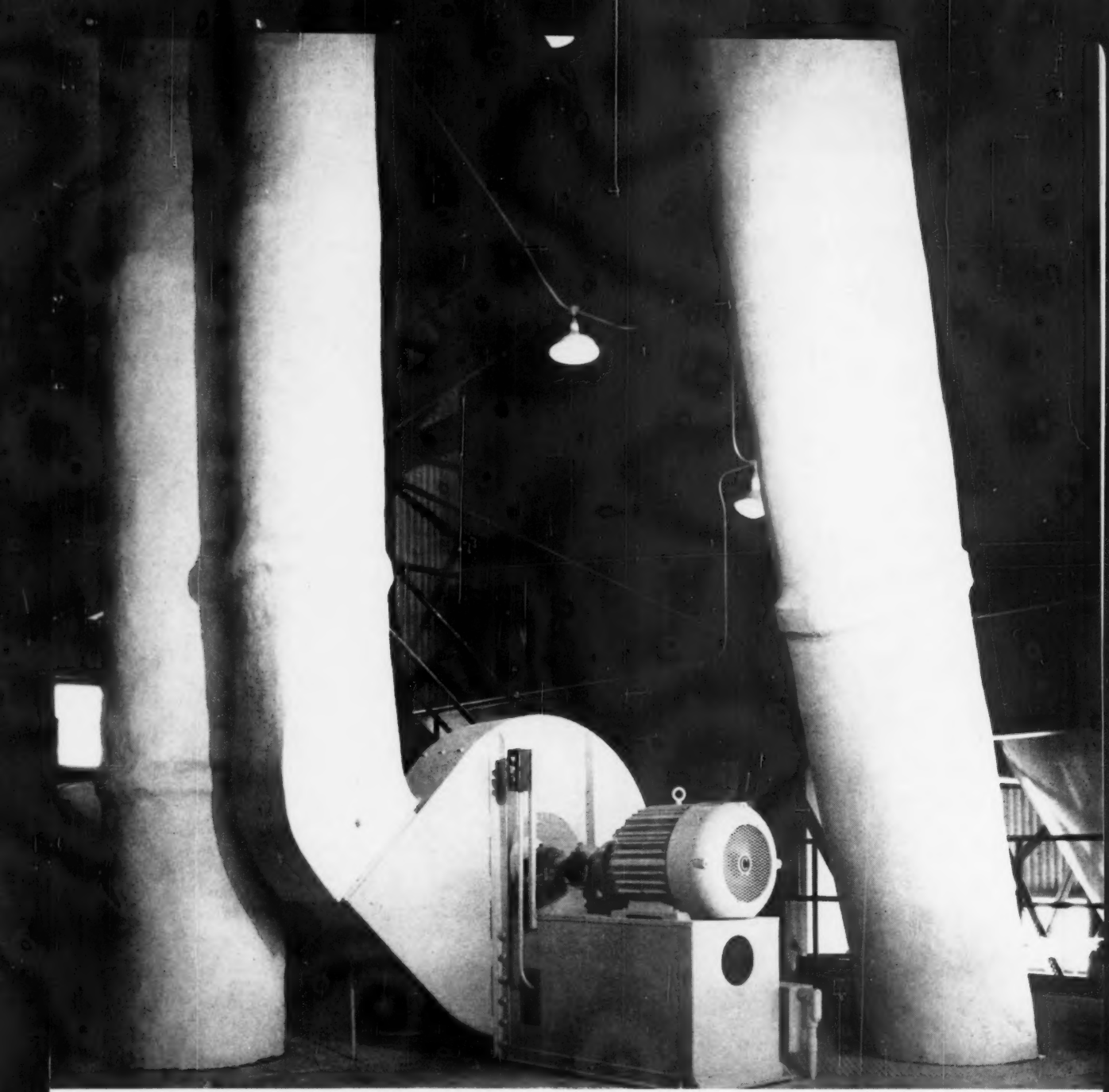
When an object interrupts the flow of air across an opening, a new control switch produces an electric signal. The switch is a pneumatic unit that detects the presence of any solid object without contact, regardless of the material. Its output signal can be used for the automatic control of production equipment. When the new switch is installed, an air line leads from a flow-control valve to an open end. A receiver tube lines up opposite the line leading from the control valve. Light pressure directed against a diaphragm actuates the switch. Any interruption of this pressure changes the position of this diaphragm, thereby reversing the contacts. (Automation Devices Inc.)



For more data circle No. 33 on postcard, p. 131

Broaching Fixture

This new universal-broaching fixture provides for general-slot broaching, as well as keyway broaching. Adaptable for arbor broaching or broaching machines, the fixture



CENTURY MOTORS DRIVE PULVERIZING MILL VENT FANS

At a plaster board plant in Georgia, Century motors are providing dependable power to drive two large vent fans on roller-type pulverizing mills. The mills crush walnut-sized rock into talcum-like powder for the manufacture of dry-wall panelling and plaster.

Two Century 30 horsepower, totally enclosed, fan-cooled motors drive the vent fans. These fans provide critical air circulation for separating air from the finely-ground powder in the cyclone. The high reliability of the Century TEFC motors helps insure the availability of these important vent fans.

For applications where abnormal quantities of dust, grit, oil or chemical fumes are present, Century TEFC motors are ideal. Their totally enclosed, fan-cooled feature makes them dust-proof, cuts maintenance costs.

Century Electric application engineers have years of experience in applying the right motor for the job. This is your assurance of getting *more* than just a motor.

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri *Offices and Stock Points in Principal Cities*

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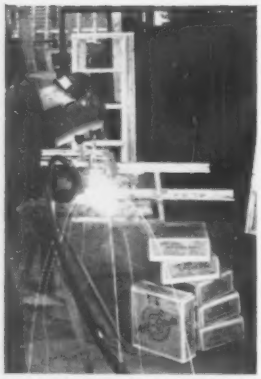
SPOOLED WIRE

USE **SPOOLARC®**



Rapid fabrication of aluminum window frames by metal inert-gas welding requires trouble free aluminum wire. Philadelphia manufacturer increased his production with mirror-finish All-State SPOOLARC®

for porosity-free welds... constant arc... better control ...fewer errors... faster work

Aluminum wire in all tempers now available in mirror finish, oil-free, precision layer wound spools. ALL-STATE's cleaning and tension controlled winding method produces wire free from helix (twist), permitting welds that do not walk.

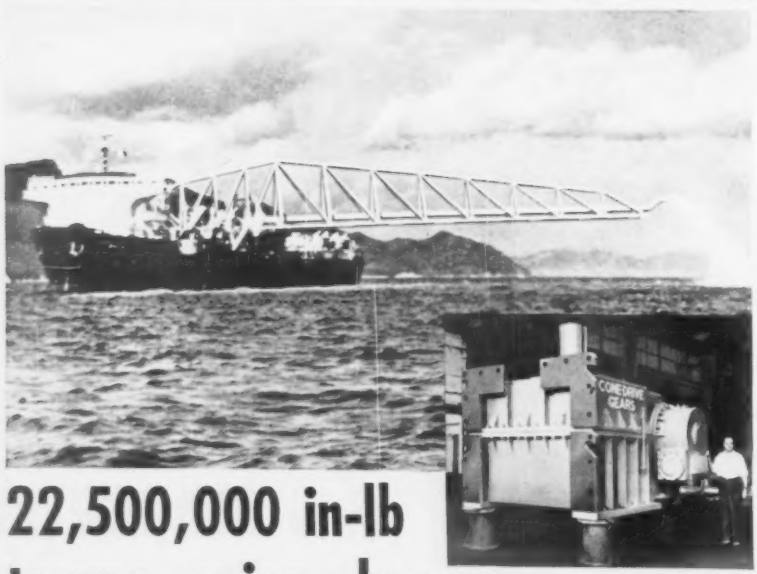
Aluminum SPOOLARC® is packaged with desiccant in sealed plastic bags to eliminate moisture, a common cause of porosity in welds.

OTHER METALS—silicon bronze, deoxidized copper, aluminum bronze, phosphor bronze, magnesium, and nickel. Available in SPOOLARC® form. For more information on SPOOLARC® and other ALL-STATE products, send for free 56-page Instruction Manual and SPOOLARC® literature.

Available from distributors everywhere.

All-State

ALL-STATE WELDING ALLOYS CO., INC.
White Plains, N.Y. Dial 914 WH 8-4646
QUALITY WITH SERVICE



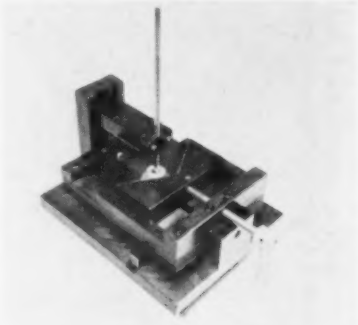
22,500,000 in-lb torque swings boom

This ocean-going dredge "Zulia" has a 437' discharge boom that rotates 180° to pump waste beyond a channel project's limits. The Cone-Drive speed reducer that does the job is shown in the inset. Due to the **double-enveloping worm** gear principle, this compact housing is capable of producing 22,500,000 in-lb torque—sufficient to "stow away" the giant boom in a 75 MPH wind.

Powerful Cone-Drive worm gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS
DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

comes with a standard centerline broach head and insert. These broach heads, paired with proper inserts, are available for almost all



centerline keyway broaching and 5° off-center broaching of slots in internal diameters from ½ to 4-¾ in. Each pair serves for many bore diameters. Thus, there's no need to make a bushing for each different diameter. (The Sure-Lok Co.)

For more data circle No. 34 on postcard, p. 131

Four-Vane Air Pumps

Four sliding vanes maintain contact against a cast-iron housing by centrifugal force, in a new air-pump design. The units have anti-friction bearings, rotary-mechanical shaft seals, inlet filters and an automatic oiler. In vacuum, pressure or gas-

boosting operations, the newcomers provide 26-in. Hg vacuums, pressures to 13 psig and volumes from 12-54 cfm. (Lieman Bros., Inc.)

For more data circle No. 35 on postcard, p. 131

Stock Gear Line

A new line of 20° pressure-angle gears are now available for

1 design planning
using long and varied experience, Mahon engineers work with your staff on initial layout stages

MAHON'S INDUSTRIAL EQUIPMENT DIVISION . . .

designs equipment but engineers results

from start to any finish your products require . . . in a coordinated, fully responsible, one-source service

The 'finishing touch' of Mahon means more than just painting equipment–it means peak-efficiency methods for the best finishing of quality products. Mahon's Industrial Equipment Division provides a unique one-contract service that is safe, sure–and more often than not, the most economical–answer to any industrial finishing problem. Mahon's multiple-area benefits are worth investigating. Get in touch with Mahon and prove it for yourself.

Mahon
industrial equipment

complete finishing systems • metal-cleaning equipment • pickling equipment • painting facilities—spray, dip and flow coating • drying and processing ovens • special process equipment

2 fabrication
of approved design is made, tested, shipped and installed by one organization—Mahon . . . to facilitate use.

3 erection & installation
of equipment and structures is speeded by skilled Mahon crews, completely familiar with finishing systems.

4 service
by Mahon means constant, trouble-free production of your quality products for maximum investment return.

WRITE FOR MAHON CATALOG A-661—ALSO IN SWEET'S P. E. FILE

YOUR BIGGEST VALUE IS IN MAHON'S PLANNING & ENGINEERING EXPERIENCE

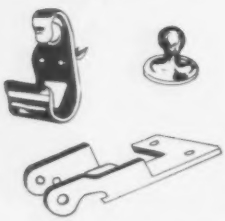
THE R. C. MAHON COMPANY
DETROIT 34, MICHIGAN

MANUFACTURING PLANTS—
Detroit, Michigan and Torrance, California
SALES-ENGINEERING OFFICES—Detroit, New York, Chicago, Cleveland, San Francisco, Torrance and E. Orange, N. J.

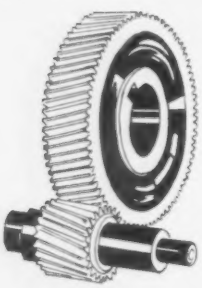
MAHON

IF YOU HEAT TREAT...

...SPRINGS



...FASTENERS



...OR GEARS

Get the best results with *Sunbeam* furnaces

No matter what you heat treat there's a Sunbeam furnace to do the job more efficiently—at *less* cost. See Sunbeam for *all* of your heat treating furnace requirements . . . any type . . . any size . . . for any product. Write or phone:

SUNBEAM EQUIPMENT CORP.
200 Mercer St., Meadville, Pa.

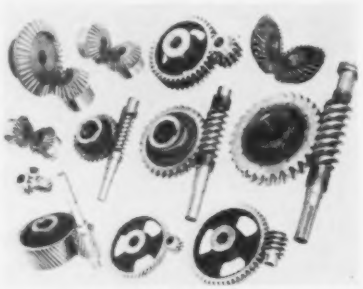
Sunbeam

The Best Industrial Furnaces made

®SUNBEAM

DESIGN DIGEST

off-the-shelf delivery. Gear types include spur, bevel, miter sets (both straight and spiral), helical and worm-gear sets. Pitches range from



3-20. High-carbon steel, alloy cast iron and nickel bronze are a few of the high-quality material options. For low-load, high-speed applications, non-metallic spur gears are available. These units are quiet, and they need no lubrication. (Morse Chain Co.)

For more data circle No. 36 on postcard, p. 131

Feeds Piece Parts

One important feature of a new, standard, small-parts feeder is its divided track. This allows an adjustment in width which is useful for handling headed parts. To pro-

vide for installation in close quarters, width is held to a minimum through the use of a horizontal-axis drum. This also allows for unusual bowl capacity. One feeder model is only 6-in. wide, with a storage capacity of 150 cu in.; the other is 10-in wide, and has a capacity of 700 cu. in. Each uses straight tracks which yield optimum control of piece parts to the point of escapement. The feeders come fully-tooled for the job, or with a blank track ready for machining. (Dixon Automatic Tool, Inc.)

For more data circle No. 37 on postcard, p. 131

Polyvinyl Chloride

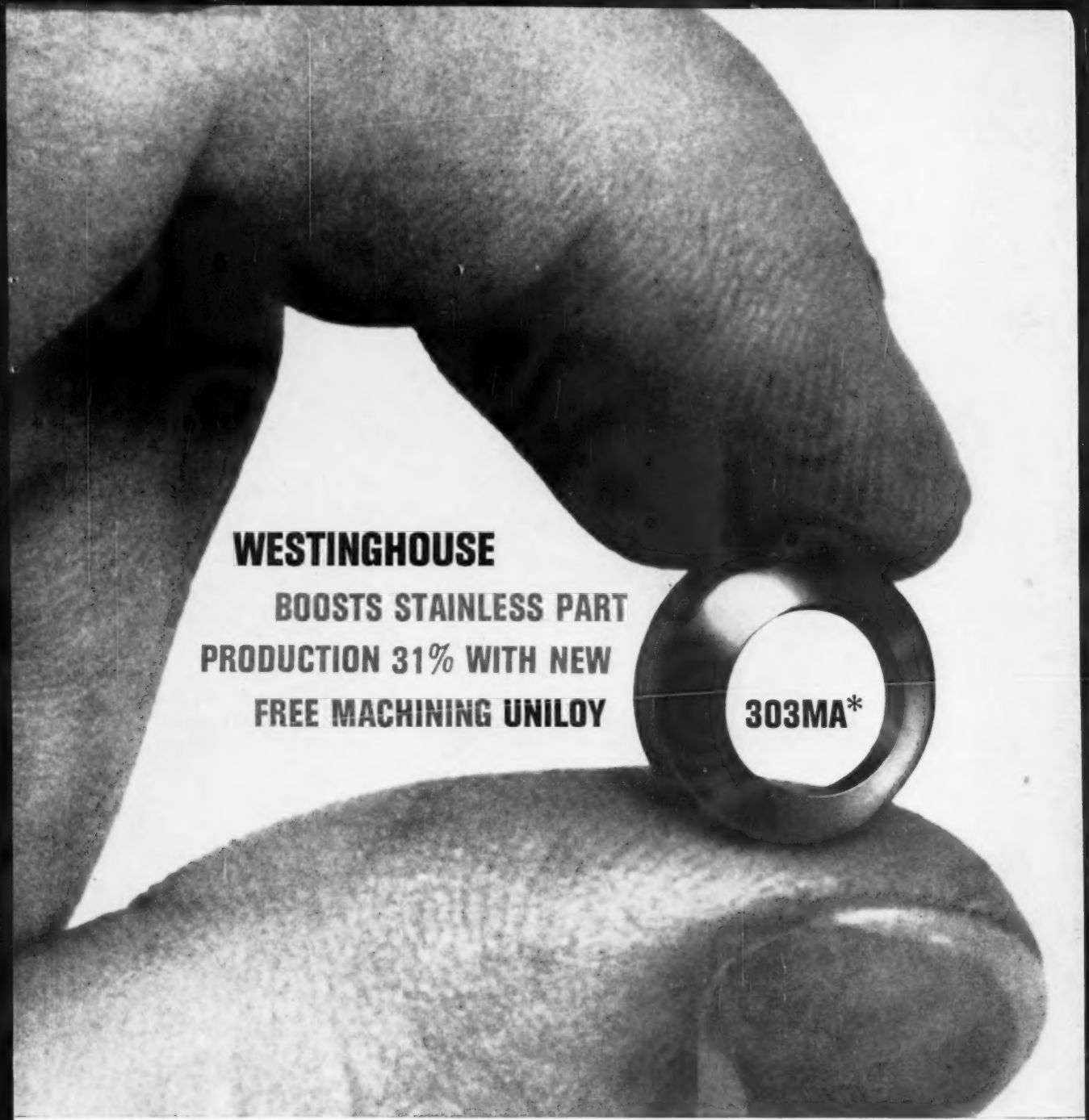
Proved under severe, two-shift operating conditions, a fume-exhaust system shows no sign of surface deterioration despite its exposure to acid and alkali fumes. It's been subjected to these fumes for 18-19 hours every working day for more than 10 months. A new polyvinyl-chloride material is responsible for this remarkable record. The exhaust system is made of it. All seams in the hoods and duct work are welded with rod of the

same material. The result is a system that's inert to fumes from nitric acid, sulphuric acid, copper cyanide, copper sulphate and muriatic pickle solutions. (Industrial Plastic Fabricators, Inc.)

For more data circle No. 38 on postcard, p. 131

Coats Spray Booths

A new paint spray-booth coating is ready for use without dilution. It's a non-tacky paste that's also nontoxic, odorless and non-flammable. You can use it wherever paint is sprayed and the overspray accumulates on surfaces from which it must be removed. This includes walls, floors and ceilings of paint booths. Easily applied by brush or spray, it forms a protective coating with high light reflectance and low gloss. When paint accumulations become heavy, the coating is quickly removed by scrapping, pressure water spray or steam cleaning. Two additional advantages are rust in-



The Westinghouse Standard Control Division at Beaver, Pa., compared New free machining Uniloy 303MA* stainless steel with regular Type 303. The part—a close tolerance spring end support for circuit breakers and control equipment—was machined from ½-inch stock. Here are the production line results:

	AISI Type 303	New Uniloy 303MA
Spindle Speed	890	1180
Surface Ft. per Min.	115	155
No. Pieces per Hour	110	144
Tool Life	Form tool sharpened 3 times every 8 hours	Form tool sharpened once every 6 hours

New Uniloy 303MA also machined cleaner and smoother to produce higher quality parts. It is now specified in all applications formerly calling for Type 303 stainless steel at this plant.

Cut *your* production costs! Order New Uniloy 303MA at your nearest Universal-Cyclops steel service center or sales office. Ask for your copy of the "Uniloy 303MA" brochure.

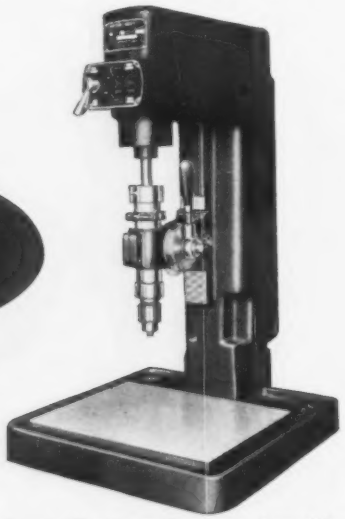
*U. S. PATENT NO. 2,900,250

UNIVERSAL CYCLOPS
UC STEEL
STEEL CORPORATION
EXECUTIVE OFFICES: BRIDGEVILLE, PA.

STAINLESS STEELS / TOOL STEELS / HIGH TEMPERATURE AND REFRACTORY METALS

production drill for precision holes

Avey



Let us show you how to knock hours off your production and precision drilling with this MA-8. Capacity to ⅜". Eight spindle speeds with 10:1 range (variable speeds optional). Hand feed or air hydraulic. 12" swing. Column or bench type. One to six of our famous precision spindles, which give you quiet, vibrationless speeds up to 12,000 rpm. Send for Bulletin 857 or phone us. Avey, Box 1264, Cincinnati 1, Ohio.

New

ARMSTRONG CATALOG

Quality Tools For Industry

New ARMSTRONG General Catalog No. 700, showing the complete ARMSTRONG Line including approximately 330 new ARMSTRONG tools added in these categories:

Tool Holders
Set-Up-and-Hold-Down Tools
Tool Bits
Wrenches
Ratchet Wrenches and Sockets
Miscellaneous Hand Tools
Pipe Tools

Anyone who uses or buys hand tools or shop tools needs this free ARMSTRONG Catalog No. 700 showing these important additions as well as thousands of other ARMSTRONG tools.

Write direct, or phone your local ARMSTRONG Distributor (Distributor name furnished upon request).

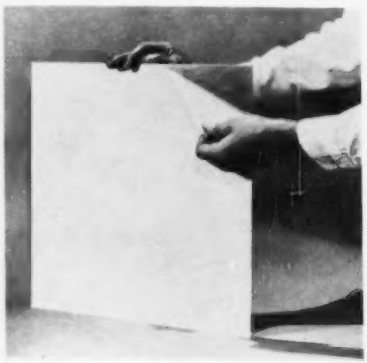
ARMSTRONG BROS. TOOL Co. 5209 W. ARMSTRONG AVE. CHICAGO 46, ILLINOIS

hibiting properties and the fact that it doesn't pick up on truck wheels or worker's shoes. (Kelite Corp.)

For more data circle No. 39 on postcard, p. 131

Guards Surfaces

A new self-adhesive protective paper covers up soft or highly-

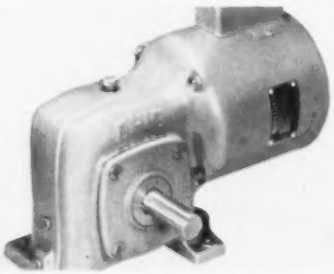


polished surfaces. An example would be polished stainless steel. The pressure sensitive material is recommended for surface protection during fabrication, shipping, storage, handling and installation. It comes off completely clean, leaving no sticky residue. Both translucent and markable, designs and names can be seen through it, or written on it. (Fasson Products)

For more data circle No. 40 on postcard, p. 131

Versatile Gearmotors

New fractional-hp gearmotors provide a powerful drive that's slower than motor speed. The man-



ufacturer points out that they offer compactness, safety, pleasing appearance and high efficiency. Agitators, blowers, conveyors, grinders, machine tools, mixers, pumps and textile machinery are some of the many applications. Both in-line and

LOWER PRODUCTION COSTS START HERE

. . . with Spaulding Value Analysis Engineers putting their heads together over your product

Spaulding interprets the Value Analysis Process as "a scientific method of accomplishing a function at the lowest possible cost."

That's why Spaulding maintains specially trained Value Analysis Engineers on its sales staff who evaluate a customer's product, then decide how it can be made better, easier, and at a lower cost through the use of a Spaulding material processed by Spaulding's own Fabricating Department.

These men save Spaulding's customers thousands of dollars annually. Why not let them put their heads together for you?

The Unique Characteristics of these Spaulding Materials and Services Hold Important Advantages for your product.

Spaulding Vulcanized Fibre: Hard, dense, extremely wear-resistant. One of the best arc-resistant, electrical and heat insulators known to industry.

Spauldite: Industrial plastic laminates.

Spauldo: A 100% rag paper electrical insulation used as motor slot insulation.

Spaulding T: A very high grade fibre board. Also known as Pressboard, Transformer Board and Fuller Board.

Spaulding Armite: An improved thin vulcanized fibre insulation (fish paper).

Spaulding Fibre Board: Made by the wet process from selected fibrous materials in various grades, including resin boards.

Fabrication Facilities: Undivided responsibility from manufacturer to finished part, with the most complete fabricating facilities in the industry.

SPAULDING FIBRE COMPANY, INC.

335 WHEELER STREET, TONAWANDA, NEW YORK

To Keller Manufacturing Co., Inc., it means a savings of nearly $50 a day in finishing costs on leaf rakes. And, theirs is a comparatively small plant operation.

Before moving into their new plant, this St. Louis manufacturer of Sweep-Easy lawn and garden tools investigated and tried out various finishing equipment. They chose Ransburg No. 2 Process to do the job because they found that only the Ransburg Electrostatic Hand Gun could give them the desirable increase in production—with improved quality—and at lower cost.

PRODUCTION IS NEARLY DOUBLED
QUALITY OF FINISH IS IMPROVED

With the Ransburg Hand Gun, Keller's daily painting prodution of leaf rakes nearly doubled what they were formerly getting with air hand spray. And, where they used to get only 168 rakes per gallon of paint, they now get 426 per gallon—over 2½ times as many—actually *an increase of over* 150% *in paint mileage.* With the unique "wrap-around" feature, electrostatic is improving the quality, providing a complete, uniform coating over all areas—even on the tine edges.

NO REASON WHY YOU CAN'T DO IT, TOO!

See how the Ransburg Electrostatic Hand Gun can save time . . . paint . . . and cut costs in YOUR finishing department. Or, if your production justifies, it'll pay you to investigate Ransburg's automatic electrostatic spray painting equipment. Write for our No. 2 Process brochure which shows numerous examples of modern production painting in both large and small plants.

RANSBURG

RANSBURG Electro-Coating Corp.
Box 23122, Indianapolis 23, Indiana

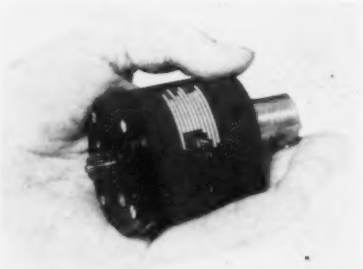
Affiliates in AUSTRALIA • AUSTRIA • BELGIUM • DENMARK • ENGLAND • FRANCE • FINLAND • GERMANY HOLLAND • ITALY • NORWAY • SPAIN • SWEDEN • BRAZIL • SOUTH AFRICA and NEW ZEALAND

right-angle gear motors are available. They suit single phase and polyphase circuits at all standard voltages and frequencies. (The Ohio Electric Mfg. Co., a subsidiary of Howell Electric Motors Co.)

For more data circle No. 41 on postcard, p. 131

Gives Fast Response

Weighing less than a pound, a new clutch-type servo actuator fulfills the need for a small, electric,

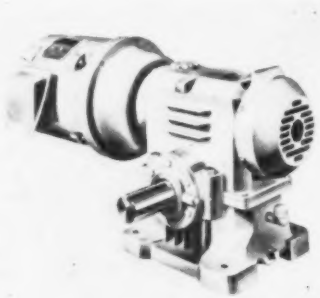


instrument servo. Developed expressly for computer and missile applications, it provides high precision with relatively-low power. Torque control is precise because of the exceptionally-sharp null in the clutch torque-current curve. Through the use of the building block concept, torque ranges are available from 1-70 in. lb. A corresponding speed range of 285-4.6 rpm is attained by simply varying the gear-reduction package. (Lear, Inc.)

For more data circle No. 42 on postcard, p. 131

Reduces Motor Speed

Motorized worm-gear speed reducers feature an unusual thread



form that eases installation and interchange of motors. The units come in eight sizes for motors from 1-20

MODERN ELECTRICS

With Features For The Future

ECONOMICAL

DURABLE

QUIET

FUME-FREE

...And A Real Pleasure To Drive

▲ The Henney Kilowatt using the body design of a foreign manufacturer is made by The National Union Electric Corp. A traction-type motor powers this remarkable "second" family car to a top speed of 32 mph. Twelve 6-volt batteries give it a range up to 50 miles and can be fully recharged in 8 to 10 hours on house current. Best of all—*cost of operation is approximately a cent per mile.*

◀ Cushman Motors' electric TRUCKSTER® boasts a hauling capacity of 1000 lbs. *plus* an operator and passenger—and this up steep grades and ramps. Its six 215-amp/hour batteries power a 2.5 HP, DC traction motor to give a "full-load" range of 50 miles between rechargings, at forward speeds up to 15 mph; reverse up to 6 mph.

◀ Shown here loading packaged coils of steel strip is Elpar's electrically-powered R-12 "Titan" Series fork truck. With a capacity of 20,000 lbs., it's part of a formidable materials handling team made by The Elwell-Parker Electric Co., producers of battery-powered trucks such as the RION "Hercules" Series with capacities up to 100,000 lbs.

The cost to operate and maintain electric-powered lift trucks is about ½ that of gasoline-driven truck costs.

Look Ahead With LEAD

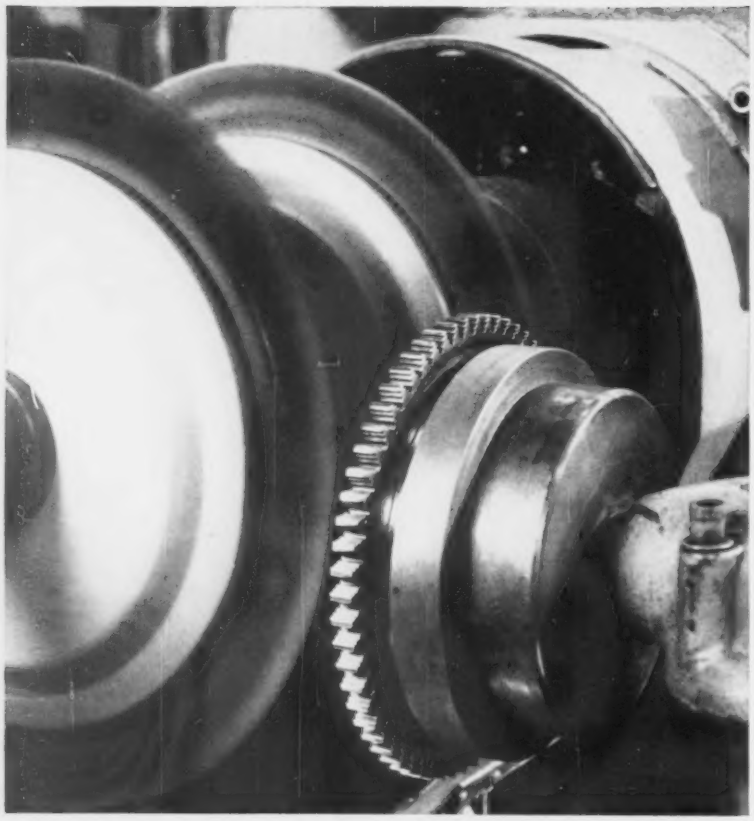
ST. JOSEPH LEAD COMPANY

250 Park Avenue • New York 17, New York

ST. JOE

PB-196

THE LARGEST PRODUCER OF LEAD IN THE UNITED STATES



GAS TURBINE DISC DOVETAILS are deburred rapidly, automatically on Osborn 3A Finishing Machine using Osborn 14" Tufmatic® power brushes. Cycle time—floor to floor: 5 minutes . . . *9 times faster than former method.*

COST CUT 90% deburring with OSBORN power brushing

Before: deburring the 64 dovetails broached on this gas turbine disc was a problem for this major producer of jet engine components. Off-hand filing was slow and costly . . . took 45 minutes per part . . . cost about $5.00 per disc.

Now: an Osborn 3A Finishing Machine—equipped with two Osborn Tufmatic® power brushes—deburrs the part automatically in just 5 minutes . . . *9 times faster*. Finishing cost is down to 50¢ per part . . . *a 90% cost reduction*. And production quality is consistently higher, more uniform.

Osborn power brushes and advanced brushing methods can help *you* same time and money on metal finishing operations of every description —deburring, cleaning, polishing, precision blending. An **O**sborn **B**rushing **A**nalysis—made at no obligation in your plant now—is the first step to savings like these. Write or call *The Osborn Manufacturing Company, Dept. F-113, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

OSBORN

Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

DESIGN DIGEST

hp. Speed ratios range from 5:1-70:1, and even higher. Either single- or double-extended gear shafts are available. The speed reducers use the involute helicoid thread form which has the highest load capacity of any type of worm gear. A compact gear box, high efficiency and quiet operation are other advantages. (DeLaval-Holroyd, Inc.)

For more data circle No. 43 on postcard, p. 131

Takes High Torque

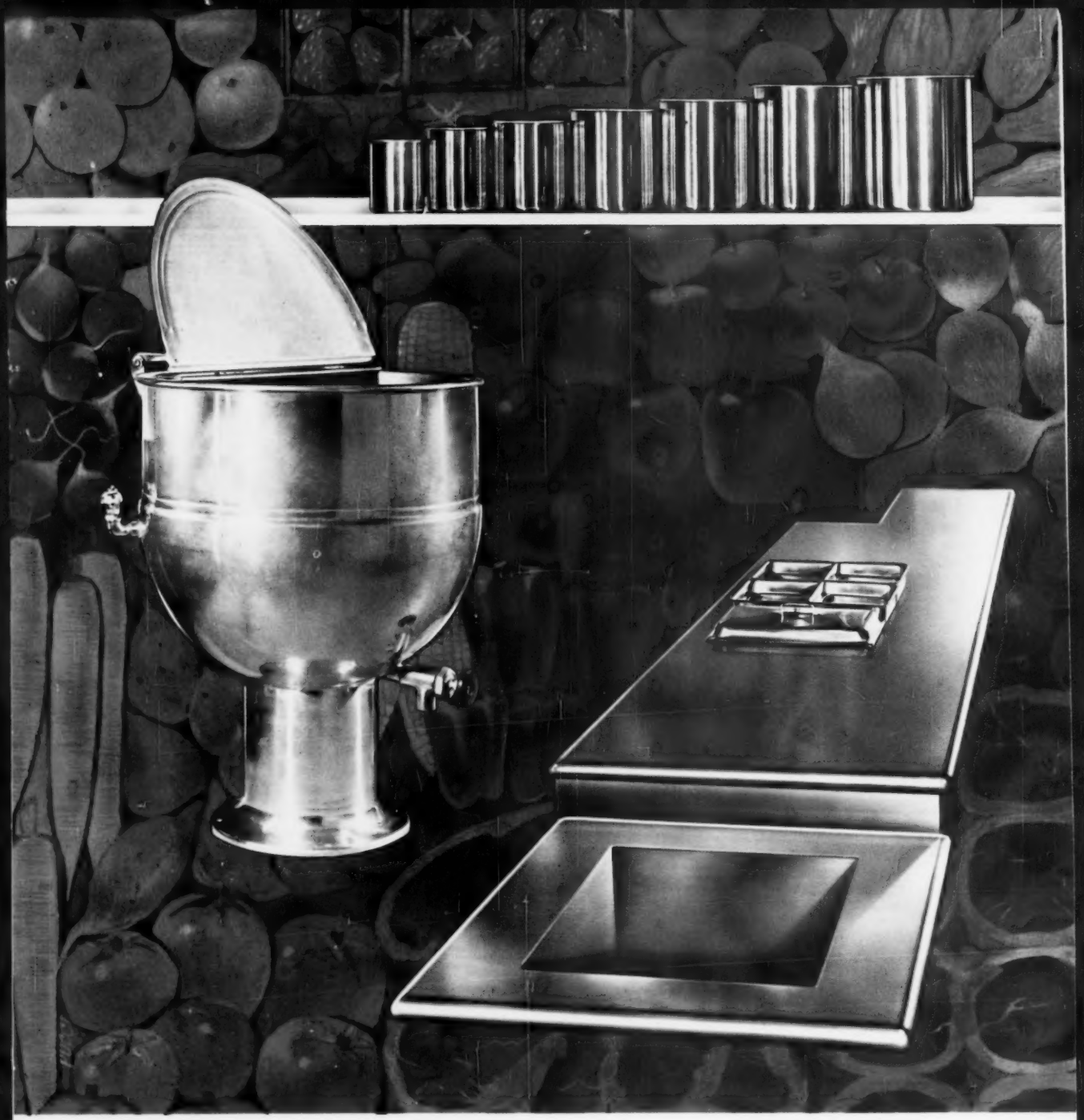
For high-torque requirements, a heavy-duty, flexible-cushion coupling is the largest and newest addition to a line of couplings. It has more than twice the torque capacity of the next smaller size, or 400 hp per 100 rpm. Even with this performance, it accommodates angular and parallel shaft misalignment. The couplings also absorb float, and shock and vibration. They're available from stock with bushings for shafts up to 7-in. in diam. Or, the units may be ordered bored-to-size for shafts as large as 9 in. (Dodge Mfg. Corp.)

For more data circle No. 44 on postcard, p. 131

Repairs Concrete

A new concrete-patching compound sets so quickly that emergency repairs can be made during lunch periods or between shifts. It's twice as strong as concrete; and it may be used indoors or out, even at freezing temperatures. As an anchoring material, the compound holds with great strength. It also resists heavy vibration. For example, in recent pull-out tests, it took a force of over 10 tons to pull a steel bolt out of an anchor made with the new material—less than 1 hour after pouring. In sub-zero temperatures, it's still effective for emergency repairs. This is so because it develops a high internal heat while curing. Best of all, the patching material comes complete and ready to use. It offers savings in labor costs due to its speed and simplicity of use. (Stonhard Co.)

For more data circle No. 45 on postcard, p. 131



It's more than a matter of taste

Wherever food and metal meet, in a processing plant or kitchen, the metal is usually stainless steel. The flavor *and* purity of food are entrusted to stainless because no other metal matches its resistance to contamination and corrosion. And none—metal or plastic—is so durable, decorative and easy to clean.

Such complete trust in a product comes only from time-tested performance—the reason J&L consistent quality stainless steel is specified by manufacturers of equipment widely used by packers and processors, and by chefs in restaurants, hospitals and hotels. By delivering quality consistently, J&L helps the food industry safeguard its products, all the way from plant to palate.

Get consistent quality stainless steel from your J&L distributor, who is backed by the full facilities of J&L's research laboratories.

Jones & Laughlin Steel Corporation

STAINLESS AND STRIP DIVISION • DETROIT 34

STAINLESS

SHEET · STRIP · BAR · WIRE

REMARKABLE NEW PROCESS

...opens way for you to solve critical high-temperature design problems

At 5500°F. cobalt runs like water. Nickel boils. Zinc vaporizes. But tungsten remains solid.

To make this property pay off for you, Sylvania recently put to work its new isostatic pressing and sintering operation. Through this operation, it can produce tungsten or molybdenum ingots up to 10" in diameter and up to 4 feet long. *Sylvania now produces all four*—billets and ingots for forging, electrodes for arc casting, blanks for machining, or machined blanks ready for your use.

Perhaps you've never considered refractory metals as the answer to your needs. But the same properties that solve the problems of throat inserts for rockets and missiles can pay you dividends in piercing points, boring bars, dies, tools and in countless other ways.

Want more facts? Or experienced technical help in proving out your special ideas? Just write Chemical & Metallurgical Division, Sylvania Electric Products Inc., Towanda, Pennsylvania.

SYLVANIA

Subsidiary of **GENERAL TELEPHONE & ELECTRONICS**

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Color Pinpoints Tubing

Color-coded conduit takes the spotlight in a new 4-page bulletin. The tubing is available in a choice of five colors—red, orange, yellow, blue, and green. Color also highlights the bulletin's illustrations, but it's backed up with concise, descriptive text material. (National Electric Div., H. K. Porter Company, Inc.)

For free copy circle No. 1 on postcard

Electronics Chemicals

An illustrated product bulletin treats on various chemicals available for the specialized needs of the electronics industry, particularly in the area of semiconductors. These include bright dips, carbon removers, cleaners, scale removers, wire strippers and ultrasonic descalers. (Fidelity Chemical Products Corp.)

For free copy circle No. 2 on postcard

Urges Business Control

"For Better Business Control," is the title of a new brochure that outlines the advantages of a medium-scale computer. It claims that this unit "supplies more data processing per dollar than any other system in its size and price range." (Minneapolis - Honeywell Regulator Co., Electronic Data Processing Div.)

For free copy circle No. 3 on postcard

Manganese Uses

This colorful, "how to" booklet offers instructions and welding tips for repairing and rebuilding worn parts. Typical applications are dipper teeth, tractor grouser bars and crusher parts. (American Brake Shoe Co.)

For free copy circle No. 4 on postcard

Power for Crushing

Power units and electric sets for crushing and asphalt plants are described in a new eight - page catalog. The catalog is complete with pictures of the various units, along with a cutaway view of the engine and its combustion chamber. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 5 on postcard

Milling Machines

A 20-page bulletin gives complete specifications for a new series of milling machines. Its illustrations cover construction, operation and optional equipment. Brown & Sharpe Mfg. Co.)

For free copy circle No. 6 on postcard

Guide to Tracing

In 10-pages, a new folder uses many diagrams and illustrations to describe a new concept in machine-shop tracing. It stresses the versatility and flexibility of the new method, as well as how the method is applied to various machines.

For free copy circle No. 7 on postcard

Processing Chemicals

In 16-pages, a two-color catalog lists chemical products, furnishes a brief description of each, and describes end uses in textile processing and leather tanning. It also includes general-purpose gums as well as enzymes for textile-desizing applications. (Nopco Chemical Co.)

For free copy circle No. 8 on postcard

Discusses Air Systems

All about make-up air systems, a new catalog depicts six basic types of gas fired, make - up air units. A total of more than 40

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **8/17/61**

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Company .....

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No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77, Village Station
NEW YORK 14, N. Y.

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THE IRON AGE

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Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **8/17/61**

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Co. Address .....

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FREE LITERATURE

models have capacities ranging from 5,000 cfm, with 750,000 btu per hr, to 150,000 cfm, with 15 million btu per hr. (Metals Engineering & Mfg. Co., Inc.)

For free copy circle No. 9 on postcard

Magnetic Drives

This new bulletin details the basic components of an advanced magnetic drive. It discusses theory of operation, controls and design features. Some of these features are: Stationary field - coil construction, liquid- or air cooled clutch system and an ac tachometer generator. (The Louis Allis Co.)

For free copy circle No. 10 on postcard

Flexible-Pipe Joints

Thirty-three pages comprise a guide for the thorough analysis of flexible-pipe connectors, their application, design, and handling. Five major sections include: Analysis of flexible-pipe connectors; interpreting engineers' specs; avoiding connector failures; proper installation; and a checklist for correct ordering. (Allied Metal Hose Co.)

For free ropy rircle No. 11 on postcard

Valves Unlimited

An 18-page technical brochure contains the latest data on a complete line of pipeline valves. It discusses cast-steel, pipe line gate valves, high - pressure, fabricated, pipeline gate valves, general pipeline and manifolding service valves, and regular port valves. (Grove Valve & Regulator Co.)

For free copy circle No. 12 on postcard

Live-Action Washers

A recently-published bulletin explains how the "live action" of a new lock washer compensates for looseness. In simple language, it tells how helical-spring-lock washers work, and how they maintain bolt tension. For a free copy, write on company letterhead to The Mellowes Co., 125-P E. Nash St., Milwaukee 12, Wis.

For free copy circle No. 13 on postcard

Talks Compressors

Horizontally - opposed compressors, in the 300-2000 hp range, are the topic discussed in a new brochure. All have motors mounted directly on the compressor shaft. This minimizes alignment problems and simplifies installation. (Joy Mfg. Co.)

For free copy circle No. 14 on postcard

Electrocleaning

A new, 8-page, illustrated booklet details the latest methods of cleaning steel before electroplating. This basic handbook features detailed outlines of specific procedures. Colorful diagrams illustrate the mechanics of both direct-current and reverse-current electrocleaning. (Oakite Products, Inc.)

For free copy circle No. 15 on postcard

Heavy-Duty Lathes

An informative eight-page bulletin describes the features and construction of new three - way bed lathes which range in capacities from 32-92 in of swing. Included are complete machine specifications. (Farrel-Birmingham Co., Inc., Consolidated Machine Tool Div.)

For free copy circle No. 16 on postcard

Aluminum Machining

Answers to common questions about machining aluminum are given in a new engineering bulletin. The publication covers speeds used on screw machines, and alloys with the best machining properties. It also recommends coolant-lubricants and provides data on tool materials and angles. (Reynolds Metals Co.)

For free copy circle No. 17 on postcard

Surface Gaging

A six-page, illustrated catalog describes a portable instrument that measures surface microfinish on metal, plastic, glass or other materials. Surface shape or composition won't affect results. Featured is a unit which weighs less than six pounds and operates away from electrical outlets. (Brush Instruments, a div. of Clevite Corp.)

For free copy circle No. 18 on postcard

Vane-Type Pumps

Fixed - displacement, vane - type fuel pumps are the subject of a new page bulletin. Vane design provides many advantages. Among these are high efficiency, high-speed capability and high output for a given size and weight. (Vickers Inc., Div. of Sperry Rand Corp.)

For free copy circle No. 19 on postcard

NEW PATENTS

Silvery Iron

Method of producing silvery iron, A. H. Dierker, June 27, 1961. A method for burdening and operating a blast furnace produces silvery pig iron at a high rate of output. It also permits variation in the silicon content of the final product. Lump ferrosilicon is added and melted with the descending molten iron. This iron contains a predetermined minimum of silicon. Thus the melt carries down into the hearth and has the desired silicon content. U. S. 2,990,271.

Iron Composition

Pelletized iron-ore concentrate composition and its production process, F. D. De Vaney (assigned to P-M Associates), June 27, 1961. In the manufacture of strong, self-fluxing, iron-ore pellets, taconite or other iron-ore concentrates are admixed with powdered coal, bentonite, and minus 28-mesh limestone or dolomite. The mixture is then pelletized. These pellets are fired sufficiently to calcine the carbonate flux completely, and to pre-slag the gangue constituents of the ore. U.S. 2,990,268.

Desulphurs Iron

Desulphurizing molten iron, R. B. Shaw and W. G. Connor (assigned to Allegheny Ludlum Steel Corp.), June 27, 1961. In the removal of sulphur from melts to ferrous metals or alloys, the oxidized melt is poured into a ladle containing solid, basic, slag-forming materials. The resulting molten slag is decanted, and the melt poured into another slagging and/or alloying ladle. Teeming the molten material into ingots in the usual manner is the final step. U. S. 2,990,272.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

New Strippit Quick-Change Holder with Micro-Set Gaging System for use on any 15-A, 10-AA or 10-A Strippit Fabricator, with jig bored Micro-Bars and Dial Indicators, allows gage settings to the nearest .001" in seconds. Guess work eliminated in close tolerance gaging—spring loaded Dial Indicators provide sensitivity and "feel" in settings. No need for special gages or jo-blocks. Use quick-reading built-in scales when close tolerance gage settings are not required.

This new system, now available on all new Strippit 15-A Fabricators, also quickly adapts to all existing 15-A, 10-AA and 10-A Fabricators. Let your Strippit Tool & Methods Engineer arrange to demonstrate this new Micro-Set Gaging System to you. Or write for Catalog MS.

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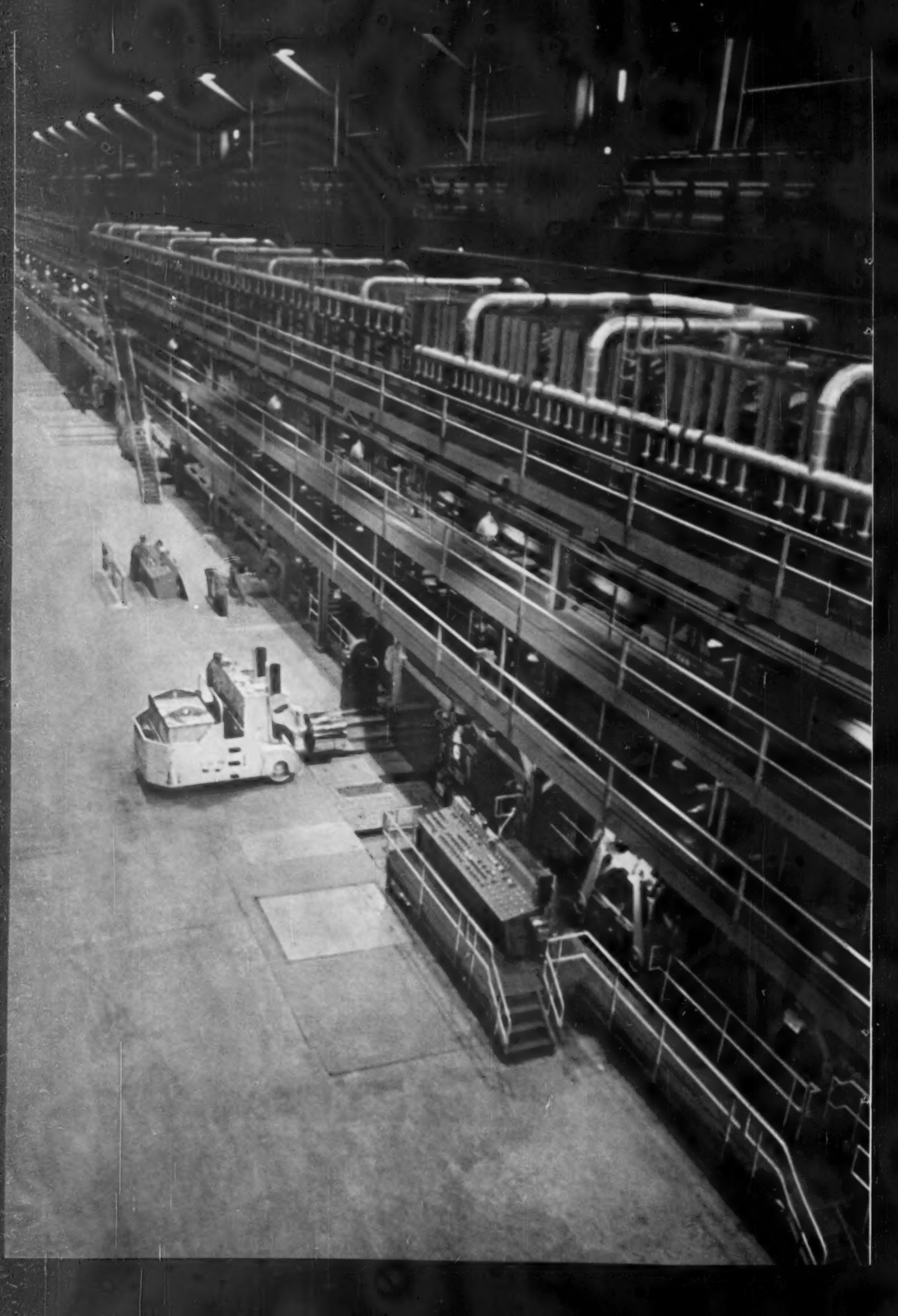

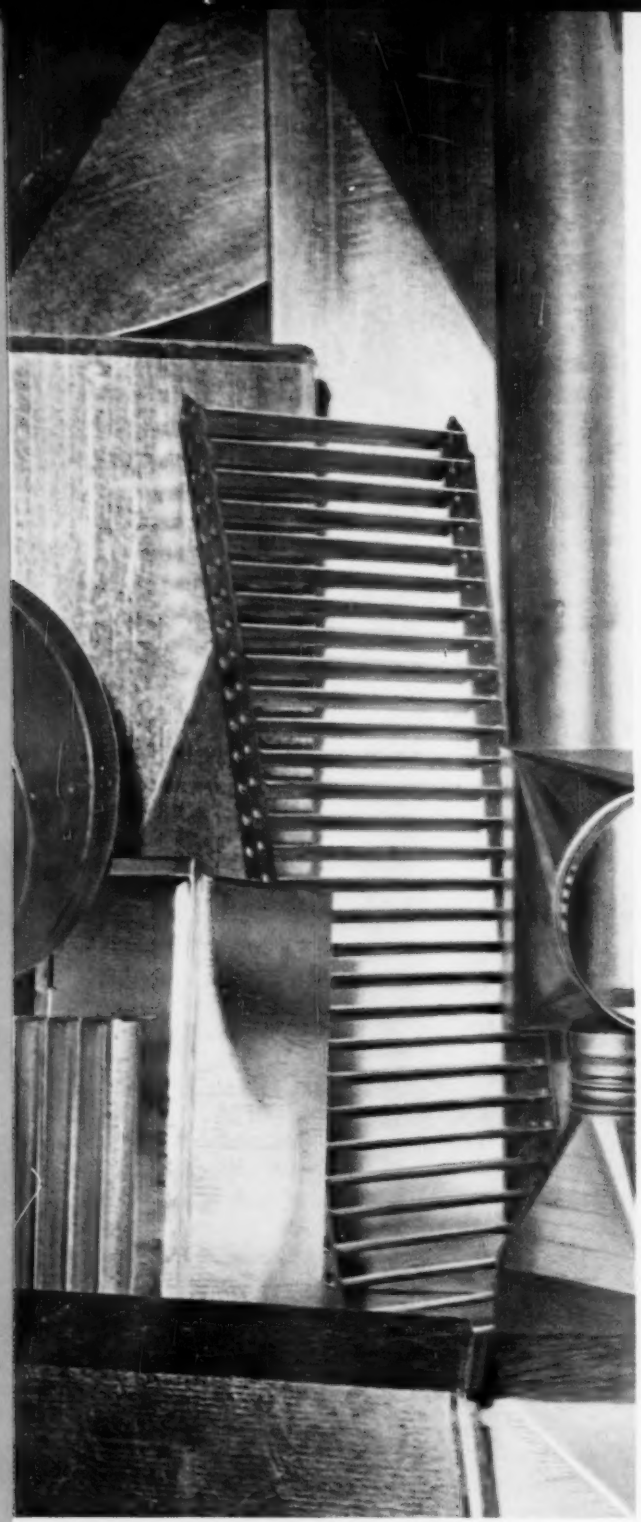

tufkote

New high quality Youngstown galvanized sheet from the industry's newest, finest mill

A new 848-foot long continuous Sendzimir galvanizing line is rolling at Youngstown's giant Indiana Harbor Works. It is the most modern line in the world. Every month it produces 11,000 tons of **tufkote,** shiny new Youngstown galvanized sheet steel in coils, cut lengths; flat or corrugated.

Youngstown **tufkote** gives you a full range of coatings with absolute adherence. You get superior corrosion resistance, better appearance. You get better workability, better forming properties of both zinc coating and base metals. Test it, bend it, draw it, cut it, crimp it. Youngstown **tufkote** offers you the best combination of strength and workability—is unequaled in superior properties.

Get the exact coating, finish and adherence your specifications call for. Specify Youngstown **tufkote.** And count on fast delivery. Like over 800 other Youngstown steel products, new **tufkote** is Youngstown-made from ore to steel to mill to final cut sheet and coil. You can depend on quality and service when you order steel from Youngstown.

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The Youngstown Sheet and Tube Company, Youngstown, Ohio

Steel

New Equipment and Machinery

Low-Cost Drill Press Boasts Versatile Operation

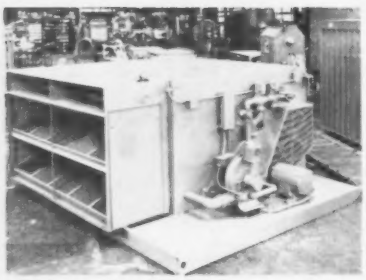
With a 2-ft arm, this radial drill press fills the gap between expensive machine-tool units and light-duty machines. It's designed for use in general industry, job shops, construction, and trade schools. Special qualities that make the press ideal for all these fields are three-fold. First of all, the tool moves instead of the work. This saves time and labor. Secondly, capacity is well beyond that of an ordinary upright drill press. And finally, the newcomer is portable and easy to handle. (Rockwell Mfg. Co.)

For more data circle No. 46 on postcard, p. 131

Aluminum Bulkheads Ease Rail-Freight Handling

Weighing one third less than steel units, a new aluminum bulkhead improves material handling in railway-freight cars. In fact, one man handles the partition without any strain. Also, single-lever control permits full-circle turning. Thus, fork-lift trucks suffer no interference because the bulkhead hugs the wall. Another advantage is that the bulkheads hang from travelling beams spanning the car's width. These beams are roller mounted on tracks which run along the car's roof. Four pins securely lock the bulkheads in place. They install in standard freight cars and in refrigerated or insulated cars. Advantages include less dead weight, corrosion and heat resistance. (Reynolds Metals Co.)

For more data circle No. 47 on postcard, p. 131



Industrial Heaters Burn Gas in the Air Stream

Unlike standard heaters, where burning occurs in a combustion chamber, a new industrial space heater has no combustion chamber. Instead, burning takes place in the air stream. Resultant gases enter the plant along with heated outside air. However these gases are less than 0.001 pct of the total volume —a generous safety margin. The heaters handle only non-recirculating make-up air; but they're particularly suited for industrial plants which generate noxious gases that are expelled by fans. (Dravo Corp.)

For more data circle No. 48 on postcard, p. 131

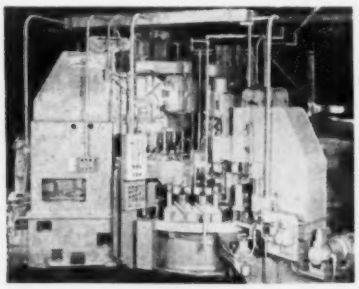
Vibrating Compaction Unit Ups Pre-Form Densities

Ushering in improved powdered-metal fabrication methods, a new vibrating compaction machine yields extremely high pre-form densities. As a result, production costs nose-dive. Capital costs also come down. A dynamically-balanced, variable vibrator provides the impact force. It delivers ten times the kinetic energy of the same-sized conventional unit. Accelerations over 20,000 times the force of gravity have been induced in powder specimens to achieve high densities. In fact, samples have been compacted to over 90 pct of the theoretical limit with this equipment. Frequencies range between zero and 500 impacts per minute. However, air consumption is surprisingly low. The control console places accurate, dynamic control of the machine at the operator's fingertips. (The Branford Co.)

For more data circle No. 49 on postcard, p. 131

Drills, Reams and Taps

An automatic indexing machine drills, chamfers, reams and taps forged-steel ells and tees in nominal pipe sizes of ⅜, ½, ¾ and 1 in.

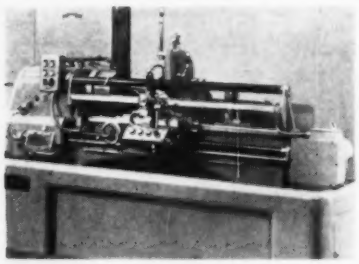


Using two spindles, and machining two pieces at a time, the machine performs the following operations: 1. Subland drills (high speed), 2. Reams—to locate accuracy of hole alignment, and 3. Taps—using special Scully-Jones adjustable, floating tap holders. Production capacity of ⅜-in. tees and ells is 200 per hour. Line hole accuracy is ±0.005 in. (Swift Ohio Corp.)

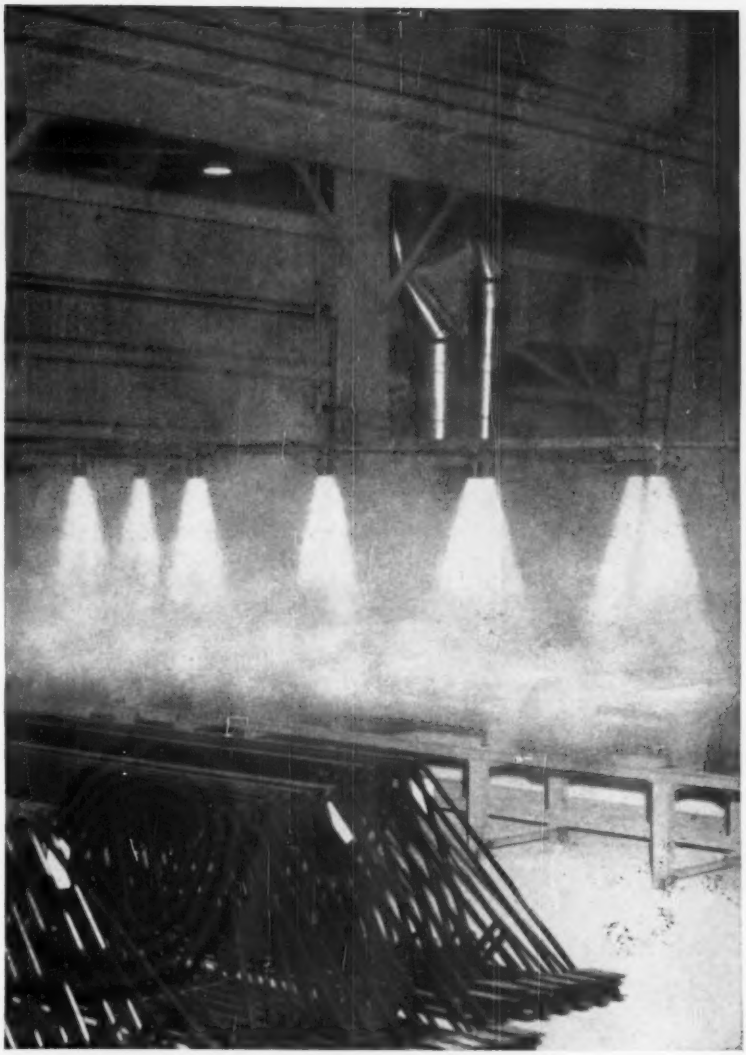
For more data circle No. 50 on postcard, p. 131

One-Pass Turning

Contour turning of round, square and hexagon-bar stock is fast and easy on a new, centerless, shaft-turning machine. Using an unusual concept of tracer turning, the newcomer features a rotating-bar stock support that's adjacent to, and travels with, the turning tool. Be-



cause the bar-stock collet support is always close to the turning tool, there's no need for a tailstock center. Rotating collet, tool and template follower assembly, and template back-up roller are all housed in one casting that's mounted on the carriage. The extreme rigidity of this combination allows higher surface speeds and feeds. At the same time, it maintains close tolerances with



What put out the flo-coat and drier fire?

For fires in flo-coaters, driers, quench tanks, dip tanks, storage rooms . . . nothing beats a Kidde fully automatic carbon dioxide fire extinguishing system. U.L. and F.M.-approved Kidde systems go into action at the first sign of a blaze, snuff out fire in seconds, leave no mess to clean up later. Protect yourself by protecting volatile solvents, gases, flammable liquids—*all hazards*—with an automatic Kidde system. Kidde's 40 years' experience can help you guard any fire hazard. Write today and find out how.

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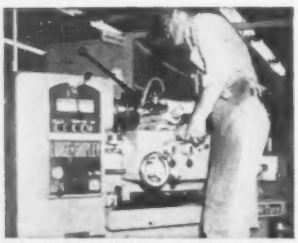
extremely-fine finishes. With almost fully-automatic operation and simplified push-button controls, an operator can often handle more than one machine. (Taber Instrument Corp.)

For more data circle No. 51 on postcard, p. 131

Leaves Its Mark

Placing a neat durable imprint, up to 2 x 6 in. on each of three sides, a new marking machine turns out up to 1500 units per hour. Of course, production speed depends on object size and weight. The machine handles covers, parts and packages of metal, cardboard, plastic, glass and other materials. In a recent application, it was used to mark the top and one or two opposite sides of voltage-regulator covers. Any of several kinds of magnetic and non-magnetic work-holding fixtures may be used. It depends on the article to be marked. Printing elements are rubber for long runs. However, for frequent imprint changes, special master-plates with quick-change inserts are available. (Markem Machine Co.)

For more data circle No. 52 on postcard, p. 131



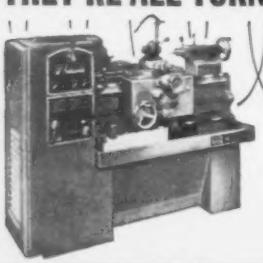
Dalmotor Div., Yuba Consolidated Industries . . . "used in model shop for turning, facing and boring all sorts of experimental parts."

Raytheon Manufacturing Co. . . . "used for turning, facing and boring operations on brass, aluminum and steel workpieces."

Over an extremely wide range of American industry . . . for tooling, production, maintenance and experimentation . . . the Lodge & Shipley 1307 HI-TURN (10") Lathe is making a record of true economy. With literally dozens of big lathe features, the HI-TURN is still priced substantially below many lathes having fewer features, less horsepower and lighter construction.

Turn your attention to HI-TURN. Find out why these and many other lathe users are ordering and reordering HI-TURN Production and Tracer Lathes to replace or supplement larger, far more costly lathes. For complete details, request Bulletin 331, The Lodge & Shipley Co., 3073 Colerain Ave., Cincinnati 25, Ohio.

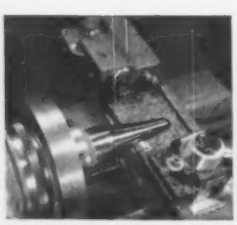
THEY'RE ALL TURNING TO Hi-Turn



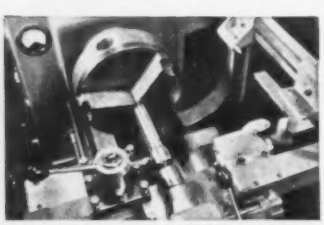
. . . your Lodge-ical choice

Lodge & Shipley

Rocketdyne Div., North American Aviation . . . "held OD turning to a tolerance of .0003" "



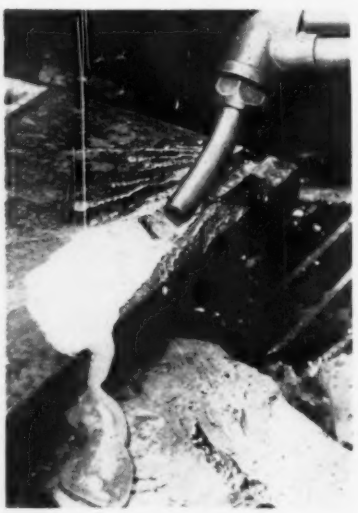
Leading glass manufacturer . . . "unheard of economy, ease and speed of production" on machining and reworking glass bottle tooling.



Indiana Gear Works . . . has earned a reputation of "excellent for high production."

Oxy-Fuel Gas Nozzles

Two-piece gouging nozzles, designed for use with natural gas and propane, satisfy a long-standing demand. They're ideal for gouging heavily-scaled or rusted plate. Castings with sand incrustations are also right up their alley. The new design incorporates a slotted-internal nozzle with an external sleeve. Slots provide a large number of individual small flames with high gas velocity. These flames combine to produce a high-intensity blast. Built-in stability prevents preheat flames from blowing off. Four-second gouging starts are not unusual with the new nozzles. (Linde Co., a div. of Union Carbide Corp.)

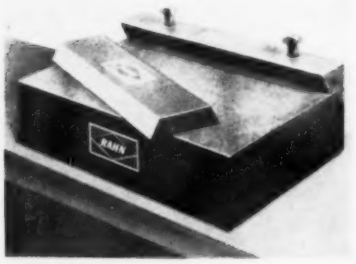


For more data circle No. 53 on postcard, p. 131

Spotting Plate

Black-granite spotting plates suit precision spotting and scraping of the 60° angle on machine gibs and slides. The plates come in a two-piece set. Machine slides are spotted on the surface plate with an attached 60° strip. This strip is easily removable so that you can apply a minimum amount of coloring. The gibs are spotted to the small

plate, which has two 60° sides. Tolerance for straightness and flatness on all precision flat surfaces is



±0.000025 in. Tolerance on all 60° angles is +0° 0′ 0″ to —0° 0′ 30″. (Rahn Granite Surface Plate Co.)

For more data circle No. 54 on postcard, p. 131

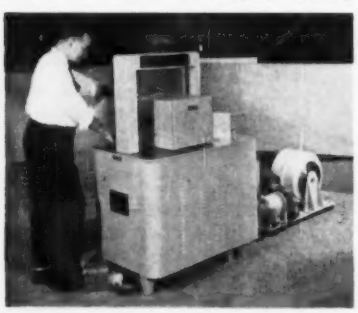
Ultrasonic Welder

Remote location of the power source, away from the welder, is a significant feature in a new 4000-w ultrasonic spot welder. Small interconnecting cables, which can be 100 ft or more in length, link the two units. This makes installation and moving of the welder a simple matter. It fits into close-packed production areas, where space is at a premium. The new unit is of commercial interest for a variety of metal and bi-metal joining. It's effective for joining refractory metals, because its operation is essentially a solid-state process. (Sonobond Corp., a subsidiary of Aeroprojects Inc.)

For more data circle No. 55 on postcard, p. 131

Straps Automatically

This new machine automatically straps packages between a minimum size of 6 x 6 in. (or any periphery

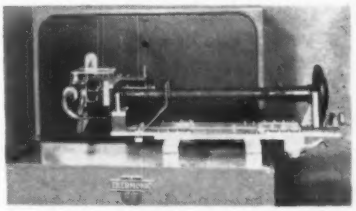


not less than 24 in.) and a maximum size of 20 x 20 in. It handles any length. The machine packages all sizes of containers within the specified limits, without adjustments. And, it handles any width of rayon strapping from ¼-¾ in. (American Viscose Corp.)

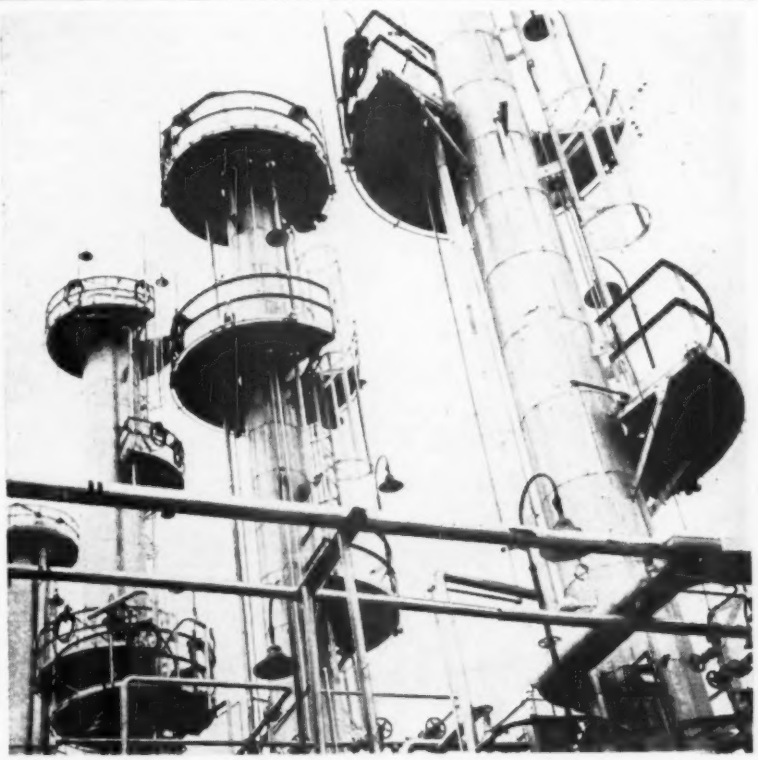
For more data circle No. 56 on postcard, p. 131

Eliminates Soft Spots

A new work-coil removes the "bug" from a tricky hardening job. The previous pancake-type work coil, because of its inherent geometry, left a soft spot in the center of the hardened surface. This new work coil eliminates that flaw. It's a natural for jobs that need a uni-



form case depth on a flat surface. The entire heating and quench cycle takes about 20 seconds. It's con-



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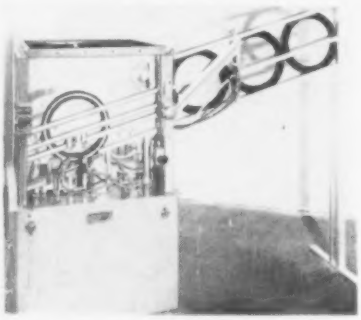
NEW EQUIPMENT

trolled by an electronic timer which can be started either automatically or manually. The coil itself gets its energy from a 20 kw generator. In one application, it hardened the end surface of a tractor axle to resist end-thrust wear. As expected, there was no center soft spot. (Induction Heating Corp.)

For more data circle No. 57 on postcard, p. 131

Paints Automatically

An automatic spray machine simultaneously paints a stripe on both sides of round parts, which can be rotated during finishing. White side-

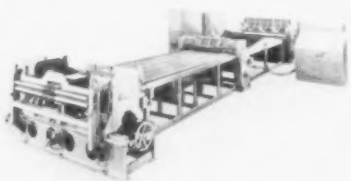


wall tires are a good example. Masking tape protection isn't needed during the painting cycle. In addition, the unit quickly and easily adjusts for various-size diameters. An automatic positioner accommodates variables in the parts, and a skip-spray device curtails painting when the part is out of position. Dubbed the "Spin Striper," the newcomer comes complete with all controls and a painting booth. (Conforming Matrix Corp.)

For more data circle No. 58 on postcard, p. 131

Squaring Shear

A new underdriven, downcut, squaring shear can cut cold-rolled



mild steel up to 3/16-in. thick and 72-in. wide. The shear has a ball bearing flywheel, pneumatic clutch, pneumatic brake with filter, regulator and centralized-lubrication system. Quick-acting automatic hold-downs prevent slippage. (Lennox Tool and Machine Builders)

For more data circle No. 59 on postcard, p. 131

Control Computer

Flexibility and high performance are features of a new industrial computer. Operating on the digital principle, it's available in a wide range of capabilities. Thus, initial investment can be limited to application requirements. After installation, the unit can be expanded to meet additional control-system requirements. Typical of the inherent flexibility is the computer's memory capacity. It can be supplied in a range from 4000 to over 100,000 words. Systems engineering, marketing, installation, and maintenance are provided by the manufacturer. (TRW Computers Co., a div. of Thompson Ramo Wooldridge Inc.)

For more data circle No. 60 on postcard, p. 131

For Sale

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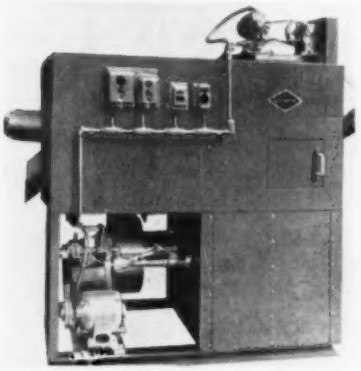
Mass-Production Dryer

Designed especially for mass-production use in the plating industry, this small, rotary-drum machine dries small parts in bulk form after

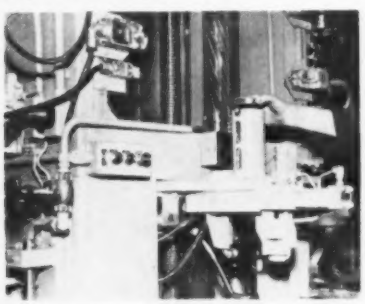


plating. It's gas heated with hot-air recirculation for maximum economy. Also, fire-box heating and blower assemblies are located under the 24-in. drum where they're out of the way. On delivery, the machine is completely assembled and wired, ready for connection to services. (The Alvey-Ferguson Co.)

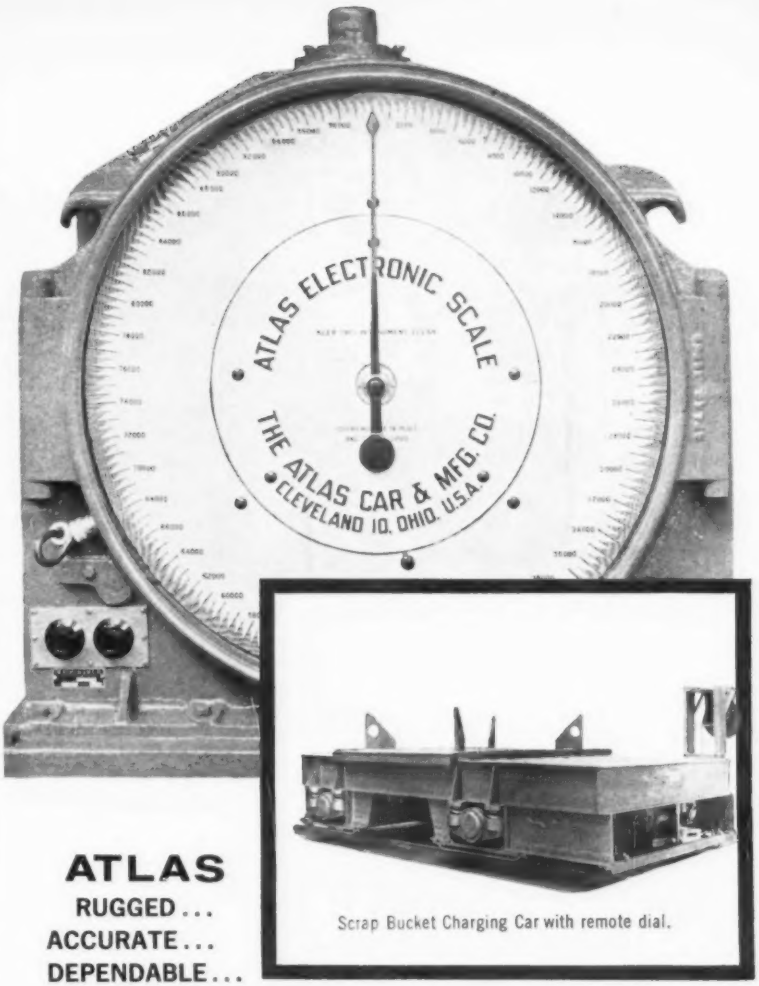
For more data circle No. 61 on postcard, p. 151

Defeats Chatter

According to a broaching-machine manufacturer, the ideal condition in pull-up broaching has now been achieved. In a new machine, matched-ball screws pull the broach. Because these twin screws line up directly with the broach, it's said that chatter is out of the picture. As a result, surface finish is greatly improved. Major effect of the new



method is that it eliminates bending forces and losses in the slide caused by the cantilever beam effect of driving the slide itself. Instead, this method transmits power directly from the gear box through ball screws to the broach. Thus, the only



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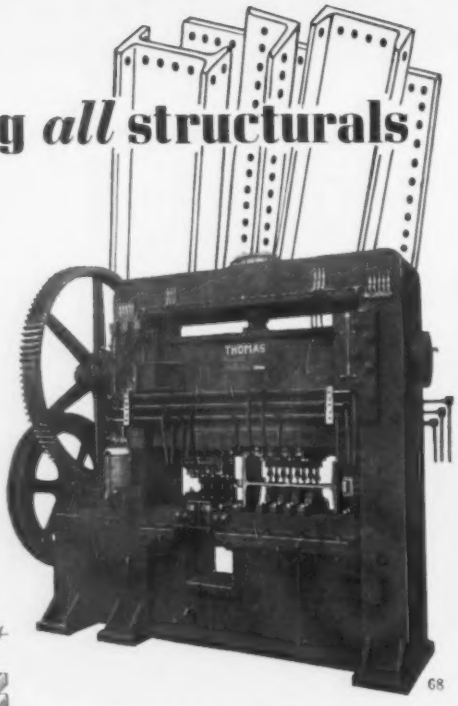
for punching *all* structurals *and* plates



These Thomas All-Steel Multiple Punches will handle beams, angles, channels *and* wide plates. Offered in 150-, 225- and 300-ton sizes, they will accommodate beams from 3" to 36" WF and plates up to 72" with minimum changing of tools.

The trend is to Thomas

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NEW EQUIPMENT

function of the machine ways and slide is to guide and stabilize the broach. (Lapointe Machine Tool Co.)

For more data circle No. 62 on postcard, p. 131

Aids Numerical Control

New regeneration and comparator systems insure accurate and speedy verification. They'll verify

tapes and duplicate both tapes and edge cards. The equipment provides great ease and reliability in duplicating and comparing 5-, 6-, 7-, or 8-bit codes. These codes are used

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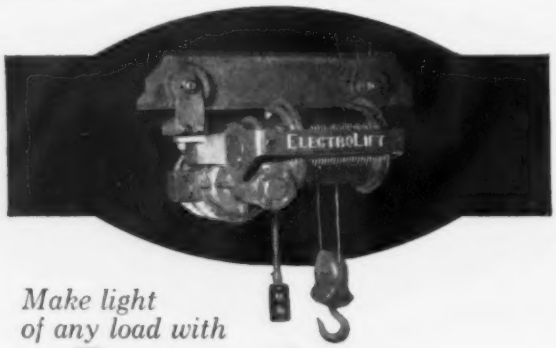

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primarily in computer and numerical-systems applications. A choice of eight systems adds flexibility. These include comparator systems, regeneration systems, or a combination of both. (Friden, Inc.)

For more data circle No. 63 on postcard, p. 131

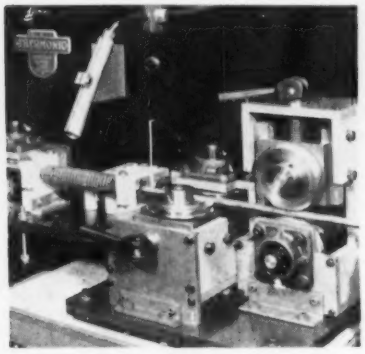
Surface Grinder

The latest addition to a line of surface-grinding machines has a new table that's wide in proportion to its length. The dimensions are 12 x 24 in. It's best suited for a tool shop engaged in highly-accurate die grinding. However, the machine takes on general production work with the addition of an automatic slot- and surface-grinding attachment, a wet-grinding attachment and a vertical position indicator. The grinder's massive spindle mounts on the flange. This allows precise slot and shoulder grinding, always a difficult problem in machining intricate die sections. A 5-hp motor supplies the power. (Browne & Sharp Mfg. Co.)

For more data circle No. 64 on postcard, p. 131

Simplifies Brazing

A new work coil aids parallel brazing of two copper tubes with different outside diameters. Key to



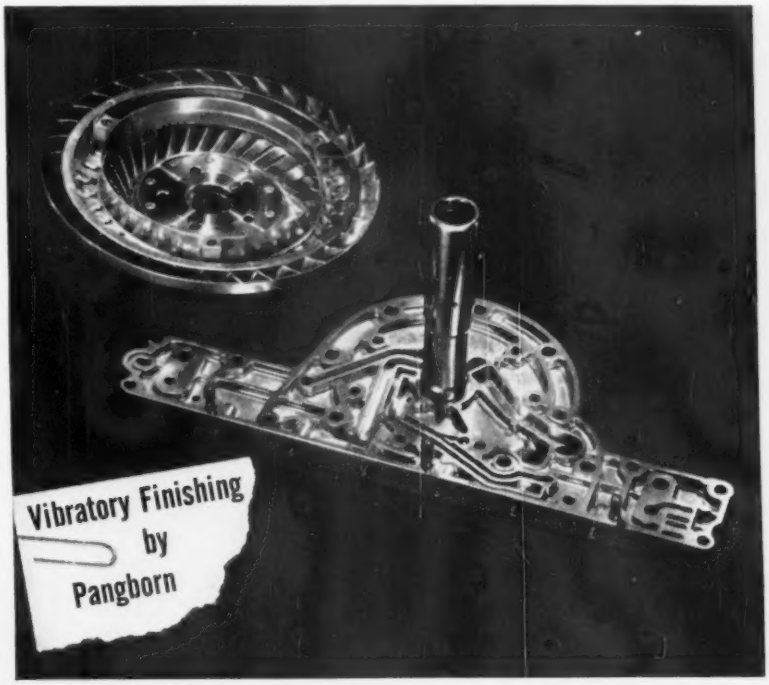
the process is a 10-kw generator which maintains a production rate of 5 fpm. If a bent tube jams the feed rollers, a photo-electric control automatically shuts off the power. (Induction Heating Corp.)

For more data circle No. 65 on postcard, p. 131

Cuts Program Costs

Designed to speed up the writing of data-processing problems, a new computer-programming system puts the burden on the computer itself. Wherever possible, routine, clerical work is shifted from the manual programmer. Instead, the full speed and power of the computer is brought to bear on this tedious operation. Its manufacturer claims that use of the new system reduces the cost of preparing programs by as much as 50 pct. To do this, the programmer states his data processing problems in simplified symbolic code. Then the computer translates it into a more-difficult machine language. In certain operations, the new system also employs a magnetic-tape library of pre-checked program segments. Desired segments are "called" from the library upon coded designation from the programmer. Use of the library saves a large amount of manual work. (Minneapolis-Honeywell Regulator Co.)

For more data circle No. 66 on postcard, p. 131



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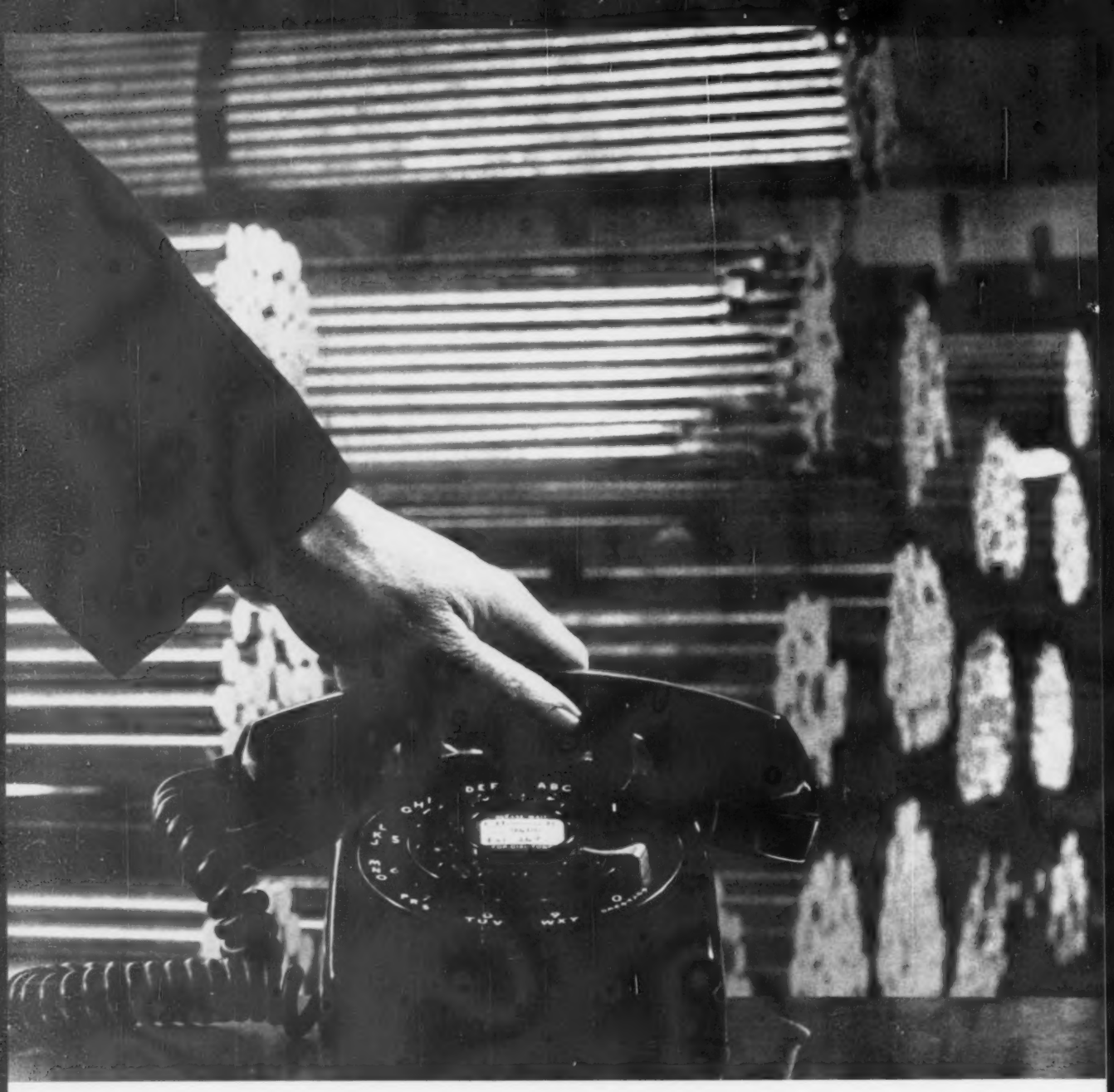

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CRUCIBLE STEEL COMPANY OF AMERICA

Orders Keyed to Auto Labor

Automakers' steel buying plans are still uncertain in advance of labor deadline.

Detroit's cautious ordering tends to confuse the short-term steel market.

■ Cautious steel buying by automakers is confusing the steel market. Automakers, slowly being backed up against the Aug. 31 labor contract expiration, are not coming in with strong orders for September, or even October. In the past week, there have been setbacks of some tonnages from August into September and, more puzzling, from September into October.

With new models starting to roll this week, auto companies will be eating into their stocks of steel. All except Ford and Chevrolet will be in production this week and these two leaders will be turning out 1962 models shortly after.

Outlook Unchanged—The automotive buying pattern is added onto other areas of business where steel buying is running behind production. This means that steel is now being consumed at a faster rate than it is being produced.

Automotive delays in ordering steel for 1962 production do not mean a weakening of the steel market. If anything, they strengthen the outlook for the fourth quarter.

When automakers and others do come into the market for full tonnage orders, delivery times will lengthen out and a sharp upturn in steel production will result.

Orders Pick Up—Outside of automotive and a few other exceptions, a good flow of orders is coming into most mills. August is definitely a better month than July. September orders, for the first time, are coming in at a rate that has pushed September ahead of August for a comparable period. If the late month pattern continues, September will show a fair pickup in steel production.

Many in industry are watching the auto labor negotiations closely and are buying cautiously for fear a strike will bring this important part of the economy to a near halt. On the other hand, many manufacturers are concerned about the low levels of their steel stocks; they know that, strike or not, auto companies will eventually be in the market for heavy tonnages and immediate delivery of many steel products will be a thing of the past.

Improvement General — The modest improvement of the past two weeks has been general, with no particular product moving out. Other than railroad buying, which is dead, and galvanized, which is out to October for some mills, the rise is broad and even.

As yet, there is no hedging against a price increase, although the steelmakers themselves are getting uneasy as the Oct. 1 wage increase approaches and government talk of controls grows stronger. Some companies have served notice that the time for concessions on extras and other factors is running out. As yet, however, there is no indication from the major steel companies of any across-the-board price move.

District Steel Production Indexes
1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	107	107	95	87
Buffalo	86	77	81	83
Pittsburgh	94	90	88	69
Youngstown	94	84	88	81
Cleveland	104	102	110	83
Detroit	119	102	120	118
Chicago	105	102	106	86
Cincinnati	120	109	112	78
St. Louis	107	115	104	70
Southern	105	108	112	82
Western	108	120	118	74
U. S. Index	102.5	99.3	99.8	81.9

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	1,910	1,850	56,146	69,197
Ingot Index				
(1957-59=100)	102.5	99.3	94.2	116.1
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$37.83	$37.83	$36.67	$32.50
No. 2 bundles	$24.50	$24.50	$24.17	$22.17

Electroplating Pickup Grows

Electroplating suppliers report continued business gains after a lagging 1961 start.

Steady prices and changing sales patterns are rated factors that will spur the advance.

▪ Through April of this year, things weren't going too well for makers of electroplating supplies. But in May business started to pick up. And it continued through June.

Now, the industry feels sure 1961 will top 1960. The general feeling is that the improvement will not be as emphatic as the pickup in the economy as a whole, however.

Steady Prices—"Changes in the industrial patterns affecting the electroplating industry point to a successful year, with prices holding steady," Robert C. Trees, vice president-marketing, Udylite Corp., told The IRON AGE.

Udylite claims to be the world's largest supplier of metal finishing supplies and equipment.

Mr. Trees reports increased sales in bright nickel processes during the second quarter. This indicates, he believes, greater purchasing of consumer products that use "bright work."

New Processes—Mr. Trees also says bi-nickel applications in the automotive field, and self-leveling single nickel and chrome applications in the appliance and marine fields, are increasing. New plating processes once considered radical are now being accepted.

How much better will business be this year? A top sales spokesman for another major electroplating supplier figures that sales of supplies will be 5 to 10 pct over 1960.

But he says there will not be much improvement in equipment sales. Many electroplaters made major expansions of their facilities three and four years ago, and are off the market for awhile. And except for more automatic operation, new equipment isn't that radically different from obsolete still-tank operations.

Old Rival—The market for used equipment still rivals the new.

A major auto company is reported to have replaced a large still-tank operation with an automated setup. It has divided its old equipment into three packages for three different buyers, at favorable prices.

From the platers point of view, deliveries continue to be good—a matter of days.

Electroplating suppliers say it is a headache. The usual pattern: First 10 days are good with high volume of standard orders; the next 10 days are quiet; and the last 10 days bring large volume of phone orders from customers who cut it too close and need material immediately.

Better Product — Competition in the industry is still very keen. This has kept suppliers busy improving their product.

One plating supplier says, "We've got cures for which there are no known diseases." Generally, these are refinements rather than revolutions says another supplier.

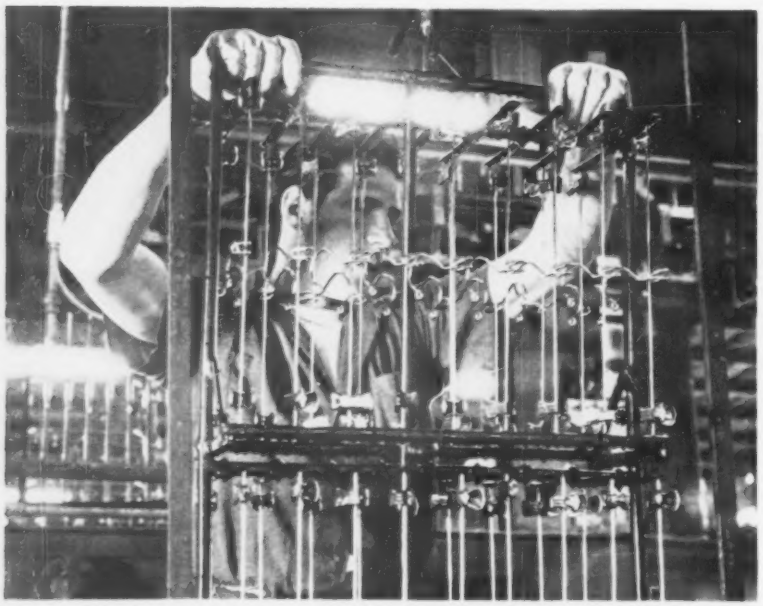
Service is also getting considerable attention.

One maker reports he is broadening his line where possible to offer "one-stop shopping" to customers and potential customers.

Other Developments — One supplier reports extensive experimenting with tin plating for its lubricating qualities. It expects to announce the results soon.

Udylite says more manufacturers are doing gold plating. This is opening up the market for coating under the gold.

In the new equipment area, Udylite will soon announce a new centrifugal dryer for metal parts.



GOLD PLATED: Appliance manufacturers are increasing fabrication of gold plated parts. Udylite Bright Nickel ≠66 serves as a basic coat at Lee-Rowan Co.'s closet accessories plant in St. Louis.

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Sales Upsurge Likely In Heavy Steels

Mill deliveries of plates and shapes appear ready to lengthen out.

Buyers are still trying to get fast shipments. But increased demand may bring more advanced ordering.

■ Plates and shapes appear ready for a delivery stretchout.

With the market improving, buyers find it harder to get the fast shipments they have depended on.

In some areas, the East Coast for example, plate deliveries have already moved out a week or two. However, structurals are still on 1-3 week delivery—or less.

Good September — There's little doubt the market for heavy steels is stronger. And further improvement appears likely. Pittsburgh area producers are looking for a sharp pickup in September orders. Present demand is called "definitely interesting," by one mill man.

At Chicago and elsewhere linepipe sales are helping the plate market. Other factors in the improved picture for plates and shapes: More orders from fabricators and builders.

First Half Increase — How well construction steel sales have held up is shown in latest figures from the American Iron and Steel Institute. During the first six months of this year, construction took 4.4 million tons of finished steel, compared with 4 million tons in last six months of '60. Plate shipments rose from 2.2 million tons in the last half of '60 to 2.6 million tons in first half '61.

If heavy steel demand stays up, users will have to drop their present policy of day-to-day ordering. This has kept mills scrambling to make shipments. Right now buyers are resisting efforts to abandon this pattern. But they may be forced to give it up.

Sheet and Strip—As yet, there's no great upsurge in September sheet sales. But the uncertain auto labor situation appears largely responsible.

Mills at **Detroit** say there are no big orders from automakers as yet. Most steel sales officials there think October will be the big month in shipments to automakers.

At **Chicago** mills say bookings have improved after a slowdown in the first half of this month. Some sellers there are cautioning users that flat-rolled deliveries could stretch out as much as 4 to 5 weeks by October or November. But customers are showing little interest in building inventories.

There are even a few signs the runaway demand for galvanized may be slowing down. Users at Pittsburgh are showing less interest in long-range ordering. But September books are full. Warehouses are still offering spot tonnages for delivery in two or three weeks.

On the **East Coast,** galvanized producers are quoting late September or mid-October delivery. At **Chicago,** galvanized continues strong without any hint of a letup.

Reinforcing Bar — Competition for orders remains red hot since major producers suspended publication of rebar prices. At **Cleveland**, for example, an order for partially-fabricated rebars went to an out-of-the-area mill which quoted $6 a hundredweight under local producers. Since fabricating accounts for about $1.50 of this price, the quote comes to about $4.50 a hundredweight, compared with the last published price in the **Cleveland** area of $5.675.

Pipe and Tubing—August could be the best month of the year for pipe mills. Shipments are moving up after a slight dip in July. Further gains are expected in September. But leadtimes are still short on most products. Most standard pipe is being shipped to jobbers out of stock on 24-hour delivery. Even then, the buyers are haggling about delivery. One **East Coast** mill got a request to ship in a day an order for a carload and a half (30 tons) consisting of 36 different items.

Oil country seamless is still being ordered out of mill and downriver depot stocks. Linepipe remains spotty, with sales good in some areas, weak in others.

Wire Products — Construction wire items, such as wire fabric, are accounting for most of the activity. In some cases, however, buyers of these products are nearing the time when they won't increase inventories for this building season.

Users of manufacturers wire are still waiting until the last minute to place orders. This is also true of alloy wire. "Few buyers are showing any interest in advance ordering," says one wire sales official.

Steel Output—During July, mills turned out about 8.09 million net tons of steel, according to a preliminary report of the American Iron and Steel Institute. This compares with the 8.5 million net tons produced in June.

PURCHASING AGENT'S CHECKLIST

Stamping industry enjoys sales upsurge; fall hopes high. P. 67

SAE H-bands for steel put stress on performance now. P. 70

New thinner tinplate is latest move in can market battle. P. 71

COMPARISON OF PRICES

(Effective Aug. 14, 1961)

Steel prices on this page are the averages of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Aug. 14 1961	Aug. 7 1961	July 17 1961	Aug. 16 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Aug. 14 1961	Aug. 7 1961	July 17 1961	Aug. 16 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti.	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. cents per lb‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$35.50	$35.50	$35.50	$31.50
No. 1 steel, Phila. area	39.50	39.50	38.50	34.50
No. 1 steel, Chicago	38.50	38.50	36.00	31.50
No. 1 bundles, Detroit	35.50	35.50	35.50	29.50
Low phos., Youngstown	41.50*	40.50	40.50	37.00
No. 1 mach'y cast, Pittsburgh	45.50	45.50	45.50	47.50
No. 1 mach'y cast, Phila.	49.50	49.50	49.50	49.50
No. 1 Mach'y cast, Chicago	48.50	48.50	49.50	47.00
Steel Scrap Composite, (per gross ton)				
No. 1 hvy. melting scrap	$37.83	$37.83	$36.67	$32.50
No. 2 bundles	24.50	24.50	24.17	22.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$31.00	$31.00	$31.00	$33.00
Copper, Lake, Conn.	31.00	31.00	31.00	33.00
Tin, Straits, N. Y.	118.50†	117.00*	116.25	103.625
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	26.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strip.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

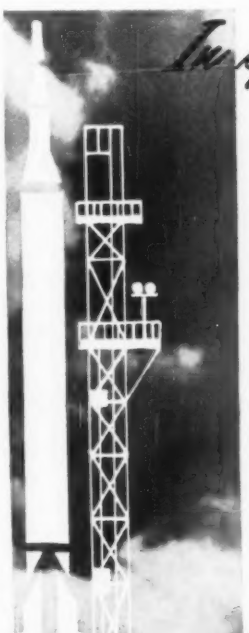
Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

INDEX TO PRICE PAGES

Prices At a Glance 145
Comparison of Prices 149
Bars 158
Billets, Blooms and Slabs 156
*Boiler Tubes .....
*Clad Steel .....
Coke 161
*Electrical Sheets .....
*Electrodes .....
*Electroplating Supplies .....
Fasteners 160
Ferroalloys 162
Iron Ore 160
Merchant Wire Products 160
*Metal Powders .....
Nonferrous
Mill Products 155
Primary Prices 119, 154, 155
Remelted Metals 155
Scrap 155
Piling 156
Pig Iron 160
Pipe and Tubing 161
Plates 158
*Rails .....
*Refractories .....
Service Center Prices 159
Shapes 156
Sheets 157
*Spring Steel .....
Stainless 160
Steel Scrap 152
Strip 156
Structurals 156
Tinplate 157
Tool Steel 160
*Track Supplies .....
Water Pipe Index 161
Wire 158
Wire Rod 157

*Appears in the Aug. 10-Aug. 24 issues.



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Hastelloy X	(4)	A286	
L605 (Haynes #25)	(4)	Rene 41	(2)
Carpenter 20	(5)	"A" Nickel (electronic grade)	

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Cleveland Reflects Underlying Strength

There is a strong undertone of strength in the market. But there are few real gains.

Prime grades move up $1 in Cleveland, on broker buying. But dealers only sold small amounts.

■ The scrap market continues to reflect strong undertones of strength. But there is little new activity to support the optimism.

Selected gains were recorded inland, where Cleveland was the most active market. This follows the gains recorded in Chicago last week.

Export is still carrying the market in coastal areas. Demand is strong enough to keep prices firm. Domestic activity is not putting enough pressure on the supply to disturb the price structure.

Ship Jam at Japan—Right now, the Japanese export market is a question mark. From all appearances, it would seem that the demand is still there. But there are reports that the new orders are slow in coming because of congestion at Japanese ports.

Because of limited unloading facilities some ships are being held up from five to six weeks. Estimates of the number of ships tied up in ports, waiting to unload range from 60 to 100 vessels.

Pittsburgh—The market is generally firm, with spot increases and reductions, but no new trend. On a late list, railroad prices were either steady or up slightly. There is no new activity in the dealer market. One mill is offering $23 for No. 2 bundles, but is holding up shipments. Reflecting the absence of real demand, dealers are reportedly being quoted $26 for both No. 2 bundles and No. 2 heavy melting to be shipped to a nearby district.

Chicago—The market held steady this week, despite stronger price demands at the dealer level. With scrap collections continuing low, dealers do not appear eager to sell at the moment. Another wave of mill purchases is expected in one-to-two weeks. But mill reluctance to advance their price offers, plus dealer resistance to present prices, seems to have brought the market to a temporary standstill. Busheling was incorrectly reported at $36 to $37 in the August 10 issue. Correct price should have been $38 to $39.

Philadelphia—There is a strengthening in the market. But so far it is just a tone. There is a steady flow of scrap for export. And there is steady pressure from domestic mills. The combination is enough to boost optimism, but not enough to bring higher prices. There are indications that No. 2 steel is in short supply as the price firmed.

New York—Primary support for the market continues to be export as the market moves along at present levels. Domestic activity is almost exclusively confined to cast grades of scrap. The flow of scrap is only fair.

Detroit—There are signs of strength and reports of difficulty in buying at present prices. There is not an overwhelming amount of scrap around. A recent buy of No. 1 heavy melting steel, later matched by another source, pegged the price of this material up $1 a ton.

Cleveland—The market is up $1 on prime grades, based on broker buying. Bullish dealers will sell only small amounts at present prices. A $41 order for 2-ft cut structural was increased to about $42 after most prime plate and busheling in the area was cleaned out by an inside order for a mill starting a new process.

Cincinnati—Orders for the month are covered but any new ones would probably meet a higher price. Dealers are feeling $1 to $2 more bullish for September. This gives the market a firm undertone.

St. Louis—Prices held unchanged this week. Most everyone is looking forward to better things now that summer is nearing its end. However, not much change is seen in scrap prices unless pressure from the outside increases.

Birmingham—The scrap market is firm. Although buying, generally, was limited, some special tonnage deals were reported this week. Brokers report consumers trying to hold the price line. Dealers are resisting. Some brokers say they still haven't been able to complete some orders.

Buffalo—A fair-sized purchase of No. 2 bundles was made during the week at quoted price levels. Local prices appear to be firming as the result of activity in other markets, particularly the Midwest.

Boston—Everything is quiet as this market continues in the summer doldrums. There were no changes over the past week.

West Coast—Prices continue on the firm side. There's some talk that one mill is paying above quoted prices, but it can't be definitely confirmed. There seems to be enough scrap around to meet demand.

Houston—Export flurry and anticipation of a further upswing in industry as a result of defense spending added strength to the market. The district mill came into the market at higher prices on orders through Sept. 30.

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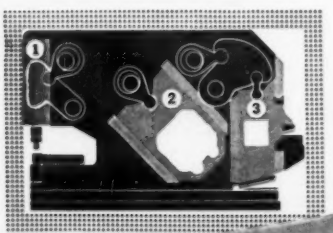

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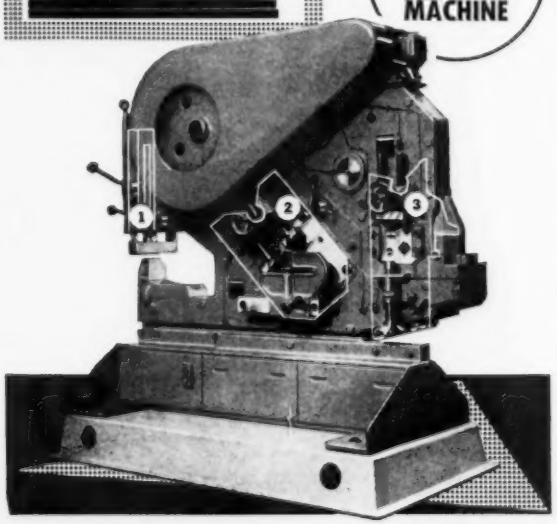

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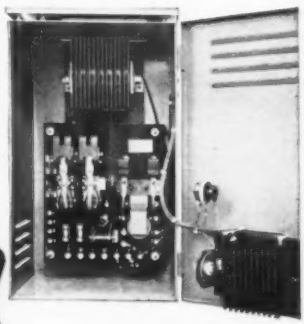

EX-27

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The EUCLID Electric & Mfg. Co.

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SCRAP PRICES *(Effective Aug. 14, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate	43.00 to 44.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	51.00 to 52.00
RR specialties	46.00 to 47.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	85.00 to 90.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	39.00 to 40.00
No. 1 factory bundles	44.00 to 45.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	47.00 to 48.00
Low phos. punch'gs plate, ¼ in. and heavier	46.00 to 47.00
Low phos. 2 ft and under	43.00 to 44.00
No. 1 RR hvy. melting	42.00 to 43.00
Scrap rails, random lgth.	48.00 to 49.00
Rerolling rails	60.00 to 62.00
Rails 2 ft and under	50.00 to 51.00
Angles and splice bars	46.00 to 47.00
RR steel car axles	60.00 to 61.00
RR couplers and knuckles	45.00 to 46.00
No. 1 machinery cast.	48.00 to 49.00
Cupola cast.	43.00 to 44.00
Cast iron wheels	35.00 to 36.00
Malleable	48.00 to 49.00
Stove plate	38.00 to 39.00
Steel car wheels	45.00 to 46.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	95.00 to 100.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Clean cast. chem. borings	29.00 to 30.00
Low phos. 5 ft and under	43.00 to 44.00
Low phos. 2 ft punch'gs	45.00 to 46.00
Elec. furnace bundles	43.00 to 44.00
Heavy turnings	27.00 to 28.00
RR specialties	44.00 to 45.00
Rails, 18 in. and under	52.00 to 54.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	42.00 to 43.00
Malleable	48.00 to 49.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	40.00 to 41.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	33.00 to 34.00
Heavy breakable cast.	30.00 to 31.00
Drop broken cast.	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Low phos. plate	41.00 to 42.00

Cleveland

No. 1 hvy. melting	$35.50 to $36.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	36.50 to 37.50
No. 1 factory bundles	42.00 to 43.00
No. 2 bundles	22.50 to 23.50
No. 1 busheling	36.50 to 37.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	41.00 to 42.00
Low phos. punch'gs plate	37.50 to 38.50
Drop forge flashings	35.50 to 36.50
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	39.00 to 40.00
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	52.00 to 53.00
Steel axle turnings	27.00 to 28.00
Railroad cast.	48.00 to 49.00
No. 1 machinery cast.	48.00 to 49.00
Stove plate	39.00 to 40.00
Malleable	51.00 to 52.00
Stainless	
18-8 bundles	175.00 to 180.00
18-8 turnings	100.00 to 105.00
430 bundles	80.00 to 85.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Cast iron borings	15.00 to 16.00
Low phos. plate	37.00 to 38.00
Structurals and plate, 2 ft and under	39.00 to 40.00
Rails 2 ft and under	48.00 to 49.00
Scrap rails, random lgth.	38.00 to 49.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	37.00 to 38.00

St. Louis

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
Foundry steel, 2 ft	31.00 to 32.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.50 to 14.50
Shoveling turnings	15.50 to 16.50
Cast iron borings	22.00 to 23.00
No. 1 RR hvy. meltings	36.00 to 37.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	44.00 to 45.00
RR specialties	40.00 to 41.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	55.00 to 56.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	38.00 to 39.00
Elec. furnace, 2 ft & under	36.00 to 37.00
Bar crops and plate	44.00 to 45.00
Structural and plate, 2 ft	43.00 to 44.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rail, random lgth.	42.00 to 43.00
Rails, 18 in. and under	46.00 to 47.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast.	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	34.00 to 35.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 2 dealer bundles	18.00 to 19.00
Mixed bor. and turn.	5.00 to 6.00
Machine shop turnings	1.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	19.00 to 20.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
1818 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	32.00 to 33.00
Drop forge flashings	32.00 to 33.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	28.00 to 29.00
Mixed cupola cast.	31.00 to 32.00
Automotive cast.	40.00 to 41.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	70.00 to 75.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	3.50 to 4.00
Shoveling turnings	8.00 to 8.50
Clean cast. chem. borings	17.50 to 18.00
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	29.00 to 29.50

San Francisco

No. 1 hvy. melting	$42.00 to $44.00
No. 2 hvy. melting	39.00 to 41.00
No. 1 dealer bundles	28.00
No. 2 bundles	25.00
Machine shop turn.	16.00 to 17.00
Cast iron borings	16.00 to 17.00
No. 1 cupola cast.	45.00 to 46.00

Los Angeles

No. 1 hvy. melting	$41.00 to $43.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 dealer bundles	28.00
No. 2 bundles	25.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	15.00
Elec. furnace 1 ft and under (foundry)	50.00
No. 1 cupola cast.	46.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 2 bundles	$25.00 to 26.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00
No. 2 hvy. melting cut 3 ft and under	28.00
No. 1 dealer bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	23.00
Bush., new fact., prep'd.	31.00
Bush., new fact., unprep'd.	25.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	24.00
Machine shop turn.	8.00
Shoveling turnings	11.00
2 ft & under	$44.00 to 45.00
Cut structural plate	
Unstripped motor blocks	29.00 to 30.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	29.00 to 30.00

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ARSENIC . . . FRIEND OR FOE?

Arsenic is useful for the resistance to corrosion and erosion which its presence imparts to copper and arsenic bronze. Alloyed with lead, it facilitates the forming of perfect spheres in producing shot.

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In quantities of more than one percent, arsenic may reduce the ductility and impact strength of steel and eventually cause surface cracking. Even small amounts may induce loss of toughness in chromium-nickel steels in the heat treated condition. Compared with some of the other residual elements, arsenic has not been one of the major enemies present in steel but it is an element that bears consideration and continued study.

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Aluminum Aims At Transportation

The aluminum industry expects big sales gains in the transportation market.

One spokesman looks to 1965 and outlines how the surge will come, and what areas will be most affected.

■ The aluminum industry seriously expects big things in transportation markets in the near future.

One aluminum spokesman predicts transportation uses will account for 78.3 pct more aluminum in 1965 than last year. This would push tonnage to over 1.7 billion lb a year, compared with 960 million lb in 1960.

And he suggests his estimate well may prove to be on the low side.

Auto Gains — In the tonnage area of this market—automotive—the forecast is for more than double: 122.2 pct increase, to be exact, by 1965. This would put automotive use of aluminum at about 1 billion lb annually, based on 7.5 million cars.

How will autos use all this aluminum? "New aluminum components which will be standard on many models by 1965 include radiators, bumpers, and wheels," says the aluminum spokesman.

"In addition, more extensive use will be made of aluminum engines, trim, and functional components such as automatic transmissions, housings, pistons, manifolds, valve bodies, pump housings and hinges."

Truck Field—And, figuring 900,000 to 1 million trucks, this area of the auto industry is expected to use "a minimum of 100 million lb" by 1965. In 1960, trucks used 60 million lb of aluminum.

"Aluminum components for trucks will include diesel engine blocks, wheels, bumpers and tilt-type cabs," says the aluminum man.

Container Area — The largest percentage increase predicted for a segment of the transportation market is 900 pct for containers. It would jump from 5 million lb used last year, to 50 million lb by 1965.

These are the large, box-shaped containers. They are sealed by the shipper and remain unopened to the final destination no matter what transportation is used. The basic aim is to consolidate bulk material, components, or smaller packages to cut the cost of handling and minimize loss during shipment.

New Standards—A big problem here has been the lack of standards. The aluminum spokesman expects a breakthrough on this eventually. He says that if this comes in the next few years, his 1965 prediction will definitely be low.

A previous market study indicated there will be from 800,000 to 1.5 million containers in use by 1970. He figures aluminum will be the dominant material in this field. He sees an average of about 2000 lb of aluminum per container.

Military Growth — A dramatic percentage increase is also forecast for ordnance, mostly military, uses of aluminum—up 400 pct to 100 million lb by 1965.

An example of the potential here is the M-113 tank, now made of aluminum armor plate.

Aerial Drop—There almost has to be a sag someplace. It's in aircraft and missiles. Use of aluminum by this market is expected to drop 28.6 pct by 1965, down to 150 million lb annually from 210 million lb last year.

Other forecasts for parts of the transportation market use of aluminum: Truck trailers, up 33.3 pct to 100 million lb; Mobile homes, up 25 pct to 50 million lb; Pleasure craft and motors, up 23.3 pct to 37 million lb; Marine, up 60 pct to 40 million lb; Small motors and miscellaneous, up 80 pct to 45 million lb; Railroads, up 100 pct to 40 million lb.

Alumina Prices

Effective Aug. 15, Aluminum Co. of America reduced prices for various grades of alumina important as raw materials in the ceramic industries.

The price decreases, some amounting to one-fourth to one-half cent per pound, apply to certain grades of aluminas consumed by the abrasive, refractory, electronic, and ceramic industries.

Tin Prices for the Week

August 8—117.25; August 9—117.50; August 10—117.875; August 11—118.50; August 14—119.25*.

*Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	81.25	74.00	6/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. **Other primary prices, pg. 155.**

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	47.8
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.2-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-7/16	15/32-23/32	3/4-1 15/16	1 3/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade		67.9	69.0	77.9	103.1
AZ31B Spec.		93.3	96.9	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0				

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.4	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	134	116	133
Shot, blocks		93	

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13		53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94		47.25	
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be ..... $ 5.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base .... $ 1.31
Cobalt, 97-99% (per lb) ..$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas, per troy oz. $35.00
Indium, 99.9% dollars per troy oz. $ 2.25
Iridium, dollars per troy oz. ..$75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb..... 57.00
Mercury dollars per 76-lb flask f.o.b. New York ..... $188 to $191
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel 77.50
Palladium, dollars per troy oz. .$24 to $26
Platinum, dollars per troy oz. ..$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per pg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 32.00
- No. 120 ..... 31.25
- No. 123 ..... 30.50

80-10-10 ingot
- No. 305 ..... 36.00
- No. 315 ..... 33.75

88-10-2 ingot
- No. 210 ..... 43.75
- No. 215 ..... 40.50
- No. 245 ..... 35.75

Yellow ingot
- No. 405 ..... 27.50

Manganese bronze
- No. 420 ..... 30.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95.5 aluminum-silicon alloys
- 0.30 copper max. 23.75-24.25
- 0.60 copper max. 23.50-24.00

Piston alloys (No. 132 type) ..25.00-26.00
No. 12 alum. (No. 2 grade) ..21.75-22.25
108 alloy 22.25-22.75
195 alloy 24.75-25.75
13 alloy (0.60 copper max.) ..23.50-24.00
AXS-679 (1 pct zinc) 22.00-23.00

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 23.25-24.25
- Grade 2—92-95% 22.00-23.00
- Grade 3—90-92% 21.00-22.00
- Grade 4—85-90% 20.00-21.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅜	18½
Red brass	23⅞	23⅛
Comm. bronze	24¾	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	28¼
No. 2 copper wire	26¼
Light copper	24
*Refining brass	25
Copper bearing material	24

*Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	28¼
No. 2 copper wire	26¼
Light copper	24
No. 1 composition	24½
No. 1 comp. turnings	24
Hvy. yellow brass solids	19 —19½
Brass pipe	18
Radiators	20½
Aluminum	
Mixed old cast.	12½—13
Mixed new clips	14½—15
Mixed turnings, dry	13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	24½—25
No. 2 copper wire	22½—23
Light copper	20¼—20¾
Auto radiators (unsweated)	16½—17
No. 1 composition	21 —21½
No. 1 composition turnings	20½—21
Cocks and faucets	17 —17½
Clean heavy yellow brass	14¾—15
Brass pipe	17 —17½
New soft brass clippings	18¾—19¾
No. 1 brass rod turnings	16½—17

Aluminum

Alum. pistons and struts	7 — 7½
Aluminum crankcase	9½—10
1100 (2s) aluminum clippings	11¾—12¼
Old sheet and utensils	9½—10
Borings and turnings	4½— 5
Industrial castings	10 —10½
2020 (24s) clippings	11 —11½

Zinc

New zinc clippings	5 — 5¼
Old zinc	3 — 3¼
Zinc routings	1¾— 2
Old die cast scrap	1¾— 2

Nickel and Monel

Pure nickel clippings	56 —58
Clean nickel turnings	43
Nickel anodes	56 —58
Nickel rod ends	56 —58
New Monel clippings	26 —26½
Clean Monel turnings	18½—19
Old sheet Monel	25 —25½
Nickel silver clippings, mixed	20
Nickel silver turnings, mixed	17

Lead

Soft scrap lead	7¼— 7½
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	90 —92
No. 1 pewter	65 —67
Auto babbitt	46 —47
Mixed common babbitt	10 —10½
Solder joints	15 —15½
Small foundry type	9 — 9½
Monotype	9¼— 9¾
Lino. and stereotype	8½— 8¾
Electrotype	8 — 8½
Hand picked type shells	5¾— 6¼
Lino. and stereo. dross	1¾— 2¼
Electro dross	2½— 3

(Effective Aug. 14, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$93.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		-
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras

(Effective Aug. 14, 1961)

STEEL PRICES

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		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Cokes▲ *1.25* lb. base box	Electro▲▲ *0.25* lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6, S15*	†Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. ▲COKES: 1.50-lb. add 25¢. ▲▲ELECTRO: 0.50-lb. add 25¢. 0.75-lb. add 65¢. 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*			Hollowware Enameling 29 ga. *7.85 U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; *7.95 G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*		6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1Y1,*	$6.25 *U1,I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, SI*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *SI*	7.225 *SI†† R3*	7.525 *R3, SI*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3,P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2,R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢. †† 7.425 at Sharon; Niles is 7.225.

(Effective Aug. 14, 1961)

STEEL PRICES

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		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.		Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.		6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3, S15*		7.70 *B5*	6.725 *B3,R5*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6, S15*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.10 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Aug. 14, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.
S15 Seaway Steel Div., Roblin Seaway Ind., Inc., North Tonawanda, N. Y.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	9.60	10.16	10.16	11.35	9.70	9.95	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.59	9.45	8.41	8.47	8.26	13.14	18.84	16.65	22.94	22.19
Boston**	.10	10.00	10.50	11.62	12.50	9.95	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.90	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.48	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	7.91	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[3]	12.15	12.10	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.67	12.85	18.59	16.68	22.69	21.04
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.34	20.59
New York**	.10	10.17	10.88	11.45	12.47	10.32	11.00	10.54	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.60	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.68	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.95	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	9.72	10.39	11.54	11.89	9.56	10.07	9.72	11.61	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item; quantities of the following: Hot-rolled sheet—10 ga. x 96 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—3/16" x 1"; Plate—1/4" x 84"; Shapes—I-Beams 6" x 12.5; Hot-rolled bar—Rounds—5/8-2 15/16"; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1 5/8" to 2 7/8"; cold drawn—1 1/16" to 2 7/8" round; Hot-rolled 4140—5/8" to 2 7/8" round, cold drawn—1 1/16" to 2 7/8" round.

†† 12c zinc. [1] Deduct for country delivery. [2] 15 ga. & heavier; [3] 14 ga. & lighter. [4] 10 ga. x 48 — 120

(Effective Aug. 14, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	73.00
Lyles, Tenn. *T3*	.....	.....	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: **Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.**

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	45
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	45

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	45
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	45

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	45
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	45

(Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25-21.50	—	19.75-21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25-26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00-31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25-29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2,* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R5;* Harrison, N. J., *D5;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2,* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1;* Claymont, Del. *P2.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11,* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

f.o.b. mill

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Aug. 14, 1961)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	....		190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	....	....	....	....	....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	....	....	....	....	....	9.00	9.55
Chicago *W7*	173	....	....	....	....	9.00	9.55†
Cleveland *A6*	....	....	....	....	....	....	....
Cleveland *A5*	....	....	....	....	....	9.00	....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	....	....	....	....	....	....
Houston *S2**	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	....	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	....	....	....	....	....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	....	....	....	....	....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	....	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	....	193	9.00	9.55
So. Chicago *R3*	173	187	...	....	193	8.65	9.20
S. San Fran. *C6*	....	....	....	236	....	9.95	10.50
Sparrows Pt. *B3***	175	....	...	215	198	9.10	9.775
Struthers, O. *Y1**	....	....	....	....	....	8.65	9.20
Worcester *A5*	179	....	....	....	....	9.30	9.85
Williamsport *S5*	....	....	....	....	....	....	....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.25	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

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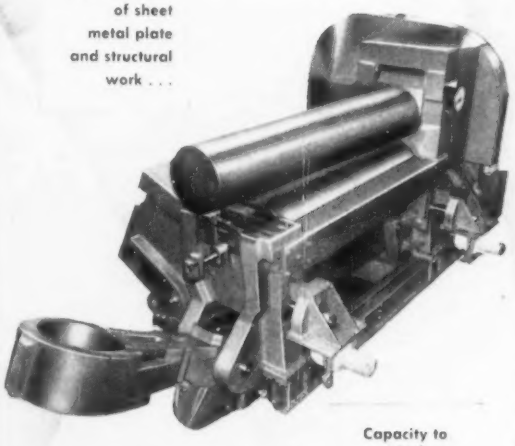
Light and heavy machinery for all classes of sheet metal plate and structural work . . .



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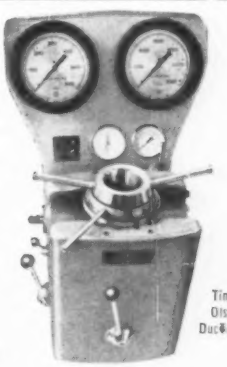

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FERROALLOY PRICES

NOTE: Prices of Boiler Tubes, Clad Steel, C-R Spring Steel, Electrical Sheets, Electrodes, Electroplating Supplies, Metal Powders, Rails and Track Supplies, and Refractories are published in alternate issues.

Ferrochrome

Cents per lb contained Cr, lump, bulk carloads, del'd. 65-71% Cr, 50-1.00% max. Si.

0.02% C	41.00	0.50% C	33.25
0.05% C	34.00	1.00% C	33.00
0.10% C	33.75	1.50% C	32.75
0.20% C	33.50	2.00% C	32.50

3-5% C, 53-63% Cr, 2.5% max. Si ... 26.00
4-6% C, 58-63% Cr, 3-6% Si ... 22.50
5-8% C, 58-63% Cr, 3-6% Si ... 22.50
6-8% C, 50-56% Cr, 4-7% Si ... 22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si ... 28.75
0.02% C (Simplex) ... 31.50
0.01% C max, 63-66% Cr, 5-7% Si ... 32.50
0.01% C max, 68-71% Cr, 2% Si max ... 31.50
0.25% C max ... 33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	22.50	14.80
Ton lots	30.45	16.05
Less ton lots	33.40	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis. V-5% 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%. Ti 9 to 11%. Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	12.70
Ton lots packed in bags	16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb.
16-19%	$98.00	$96.00	$109.50
19-21%	100.00	98.00	102.50
21-23%	102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk	34.25
Ton lots, palletized	36.25
250 to 1999 lb	39.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn ... 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads Ton		Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk	11.60
Ton lots, packed	13.25
Carloads, bulk, delivered, per lb of briquet	14.00
Briquets, packed pallets, 2000 lb up to carloads	16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe	22.95	21.65
98% Si, 1.0% Fe	21.95	20.67

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	13.50	75% Si	16.90
65% Si	15.75	85% Si	18.60
	90% Si	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.20
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb	2.40	3.30	4.55

(Effective Aug. 14, 1961)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y. per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo ... $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, del'd per lb con't Cb

Ton lots	$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.50% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta ... $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton ... $120.00
10 tons to less carload ... $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Vanadis, O., O., freight allowed, ton lots, per lb contained Ti ... $1.35
Less ton lots (200 lb and up) $1.37

Ferrotitanium, 30% low carbon, 0.10% C max., 27-32% Ti, Vanadis, O., freight allowed, per lb contained Ti, ton lots ... $1.35
Less ton lots (200 lb and up) $1.40

Ferrotitanium, 1-3% Carbon, 17-20% Ti, f.o.b. shipping point, freight allowed, carload per net ton ... $250.00
Ton lots ... $260.00

Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered ... $2.45 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. ... $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. ... $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 ... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload ... $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb & over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... 2.15

The single, most important advance in the whole history of disposable tooling

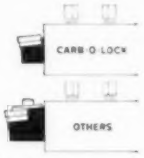
Just 3 parts (not including insert) means minimum parts inventory, greatly reduced possibility of part failure, much less downtime, lower costs.

Streamlined silhouette because "clubheads," clamps, screws are eliminated.

15 styles, 124 sizes for triangular and square inserts. Shank sizes from ½" square (replace your brazed tooling) to 2" square.

Elimination of insert pocket results in larger end-cutting angle. Can be used on many tracer applications.

Minimum overhang of Carb-O-Lock reduces space requirements for locking mechanism.



Insert changing and indexing is a breeze. Turn wrench to unlock, replace or index insert, then turn wrench to relock.

New Carb-O-Lock toolholder-insert combination cuts tool costs up to 40%!

Save 30% and more when you buy it . . . 40% and more when you use it. The key to the new Carb-O-Lock: Simplicity!

Think of it! Now you can cut your disposable tooling costs by up to 40%! You save and keep on saving, because savings are designed right into the new Carb-O-Lock toolholder-insert combination.

Truly unique in toolholder design, the Carb-O-Lock employs just three parts (not including insert)—compared with up to 12 parts in other toolholders. Using a cam-action locking principle, the Carb-O-Lock toolholder makes insert changing and indexing easy as one, two, three! And the streamlined design of this revolutionary toolholder lets you bring it closer to the work, with unrestricted chip flow.

Carb-O-Lock toolholders are available right now in toolholder shank sizes from ½" square to 2" square for square inserts and ½" to 1½" on toolholders for triangular inserts. The specially processed disposable inserts have been developed in Carboloy® Grade 883 for machining cast iron as well as many operations on high-temperature alloys, type 300 stainless steel, brass, and bronze.

They are held to tolerances of ±.002" on ¼" I.C. to ±.004" on the 1" square and they cost 40% less than some precision-ground (±.001") inserts.

These inserts have cutting edges composed of whole carbide crystals which are stress free, and notch free like Carboloy Pre-Honed inserts. And, to make your changeover easier, Carb-O-Lock inserts are designed to fit most square or triangular negative rake toolholders you may now be using.

Carb-O-Lock inserts come skin-packed on a file-drawer size, color-coded card for easier inventorying, faster identification.

See just how this brand new toolholder-insert combination can bring *better profits through better tooling* in *your* metalcutting operation. Phone your Authorized Carboloy Distributor and place your order for the Carb-O-Lock toolholder-insert combination.

Great! . . . *revolutionary!*

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No. 5 Johnson Geared O.B.I. Press. Late.
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TX 4-5802

Buildup Boosts Coast Business

Increased sales and inquiries are reported by West Coast machinery dealers.

The defense buildup should push this advance even further, with greater demands for big equipment, mills and lathes.

■ West Coast used machinery dealers report increased sales and inquiries. And they have great expectations for the balance of this year's business.

Behind the optimistic outlook is President Kennedy's more-billions-for-defense program. It will mean much to defense-oriented Farwest manufacturing centers.

The huge southern California market is bustling. Grinders are a hot item. Small mills and lathes are moving well. Brakes, shears, and other sheet metal equipment are still selling well. Electronics makers are after small automatic lathes.

Big Equipment—Dealers look forward to heavy demand for big-size equipment when the increased defense work gets into high gear. They expect increased calls for mills, turret lathes, and large duplicating mills.

Used machinery customers manage to pick up good buys. Many dealers want to clear their floors of older inventory. They're making room for newer equipment.

Dealers have little trouble getting machines. This is due to two factors: Government surplus sales; and stepped-up plant expansions, as well as new plants. Buyers are not going into Eastern markets for much equipment.

Gain in North—In northern California, optimism that began several months ago is gaining momentum.

"Business continues to pick up. The way thinks look right now, we should have a good year," one dealer told The IRON AGE.

There never was a shortage of inquiries, he said. But now a number of them are coming in as orders.

The supply of good machinery is ample, several dealers report. Prices continue to be attractive.

Best Month—One dealer said his business is running about 25 to 30 pct ahead of any month thus far this year. Most dealers in the San Francisco Bay area have good inventories and are eager to keep them moving.

Buying from the East is spotty. A few dealers say they can get just about anything they need locally. Others who deal in heavy equipment—big presses priced at around $10,000—find it profitable to import such machinery from Eastern sources.

Prices are slanted in favor of shoppers. Yet, good used equipment still brings about 60 pct of the cost of an equivalent new piece. Lathes, shears, brakes, and drills are in fairly strong demand.

Government Deals—Some dealers continue to complain that government surplus machinery still gives them rough competition. Many would-be customers buy directly from this source.

Small one-man shops keep cropping up. With limited financing, they turn to used machinery.

Increased defense spending should add impetus in the months to come. But it's too early to tell yet. It takes contracts to spur business, one dealer pointed out.

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BRAKES SHEARS

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42" Mesta Slitting Line, New 1940, consists of: Cone Type Uncoiler with hydraulic lift, Tensioning Machine, 42" x 5½" Arbor Motor Driven Slitter, Recoiler with hydraulic stripper and 80 H.P. variable speed drive. Complete with all motors, electrics, 100 H.P. M.G. Set and Desk Type Control Stand.

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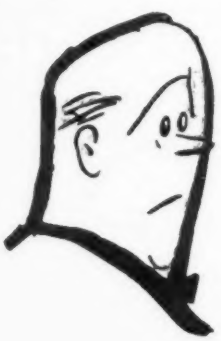

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about personnel problems

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500# /hr. LECTROMELT Top Charge
Like new amplidyne controls.

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11' HEROULT Top Charge
DETROIT FURNACES—10 lb. to 300 lb. Cap.

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10—50 KW to 200 KW TOCCO Units

15 KW GIRDLER Dielectric Heater
20 KW THERMONIC Induction Heater 2 station
20 KW ECCO Induction Heater
100 KW AJAX Production Unit

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200 KW 960 cycle, 1000# steel

Large stock gas-oil-elec. heat treat units

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1—3½" & 8½" x 5½" STRIP MILL, 4-high.
1—16" BAR MILL, 3-high, single stand.
1—9" BAR MILL, 3-high, five stands.
3—HOT STRIP DOWNCOILERS, for widths up to 75", max. coil diameter 54".
1—VERTICAL OPEN-SIDE BAR SHEAR, 28" knife, capacity 1" x 24" or equal.
2—SQUARING SHEARS for ¼" x 156" sheets.
1—SQUARING SHEARS for 10 ga. x 120" sheets.
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1—175 TON HOT METAL CRANE, 54' SPAN, 4 GIRDERS.
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COMPLETE MECHANIZED SHEET MILL CONSISTING OF CONTINUOUS FURNACES, 3-HIGH ROUGHING STANDS, 2-HIGH FINISHING STANDS, MILL TABLES, DOUBLERS, COLD MILLS, LEVELLERS, SHEARS, ANNEALING FURNACE, MECHANICAL PACK OPENER, ROLL LATHE.

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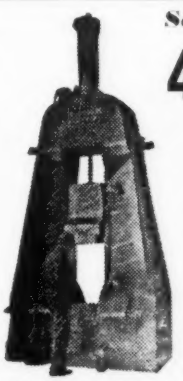

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Personnel Department #24

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A

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*Allegheny Ludlum Steel Corp. 53-58
*Allen-Bradley Co. 82
*All-State Welding Alloys Co., Inc. 120
American Smelting & Refining Co. Federated Metals Div. 47
American Society for Metals 117
*American Tool Works Co. 10
Ansco Div. General Aniline & Film Corp. 24
*Armstrong-Blum Manufacturing Co. 29
*Armstrong Bros. Tool Co. 124
Atlas Car & Mfg. Co. 141
Atlas Steels 76
*Avey Div. 124

B

*Babcock & Wilcox Co. Tubular Products Div. 4
Bailey Machine Tool Accessories, Inc. 164
Baldt Anchor, Chain & Forge Div. 167
Belyea Co., Inc. 164
Bertsch & Co. 161
*Bethlehem Steel Co. 1, 17-20
Bound Brook Bearing Corp. of America 87
Branson Instruments, Inc. 116
*Buffalo Forge Co. 46

C

Carborundum Co. 84
Carco Industries, Inc. 167
Carlstrom Pressed Metal Co. 167
Century Electric Co. 119
Chicago Rawhide Mfg. Co. 16
Chicago Pneumatic Tool Co. 62-63
Clearing Div. U. S. Industries, Inc. 107
Cleveland Worm & Gear Div., Eaton Mfg. Co. 66
*Conco Engineering Works, Inc. 113
Cone-Drive Gears Div., Michigan Tool Co. 120
Consumers Steel & Supply Co. 166
Copperweld Steel Co., Ohio Seamless Tube Div. 61
*Crucible Steel Co. of America 144

D

*Danly Machine Specialties, Inc. 27
Detroit Steel Corp. 90
Donahue Steel Products, Co. 166

E

Electrode Div. Great Lakes Carbon Corp. 147
Electro Lift, Inc. 142
Erie Equipment Co. 165, 166
*Erie Foundry Co. 37
*Euclid Electric & Mfg. Co. 151
Eveready Supply Co. 165

F

Falk Machinery Co. 164
Federal-Mogul Service Div. Federal-Mogul-Bower Bearings Inc. 28
*Federated Metals Div. American Smelting & Refining Co. 47
Fitzsimons Steel Co., Inc. 166
Foster, Frank B., Inc. 165
*Foster, L. B., Co. 25

G

*Gardner-Denver Co. 26
Gardner Machine Co. 22
General Aniline & Film Corp. 24
General Services Administration 140
Gilbert Merrill Steel Corp. 166
*Gisholt Machine Co. 50
Goss & DeLeeuw Machine Co. 168
Great Lakes Carbon Corp. 147

H

Harbison-Walker Refractories Co. 36
Haynes Stellite Co. Div. Union Carbide Corp. 40-41
*Heller's Son, E. G., Inc. 151
Hughes, Arnold, Co. 165, 166
Hyman, Joseph & Sons 165

I

Industrial Distributors, Ltd. 44-45
Ingersoll-Rand Co. 51
International Nickel Co., Inc. 167

J

Jones & Laughlin Steel Corp. Stainless & Strip Div. 127

K

Kaiser Engineers 35
Keystone Forging Co. 167
Kidde, Walter & Co., Inc. 137
King Foundries, Inc. 167
*Kobe Steel Works, Ltd. 159
Koppers Co., Inc. 42
Krupp International, Inc. 166

L

*Lamson Corp. 88-89
Long Machinery Co., Inc. 165
Lindberg Engineering Co. 52
Linde Co., Div. Union Carbide Corp. 59-60
*Lodge & Shipley Co. 138
Loftus Engineering Corp. 43
Luria Bros. & Co., Inc. 153

M

McKay Machine Co. 114-115
*Macwhyte Co. 78
*Mahon, R. C. Co. 121
*Malleable Castings Council 110-111
*Meehanite Metal Corp. 118
Mesta Machine Co. Inside Front Cover
Metal & Thermit Corp. 80
Metallurgical Products Department General Electric Co. 163
Michigan Tool Co., Cone-Drive Gears Div. 120
Minneapolis-Honeywell Regulator Co. 48-49
*Mundt, Chas. & Sons 151

N

National Business Bourse, Inc. 167
New England High Carbon Wire Corp. 140
New England Pressed Steel Co. 167
*Niagara Machine & Tool Works 14

O

*Ohio Crankshaft Co. 59
Ohio Seamless Tube Div. Copperweld Steel Co. 61
*Olsen, Tinius, Testing Machine Co. 161
Osborn Mfg. Co., Brush Div. 128

P

Pangborn Corp. 143
Parker Rust Proof Co. 30
*Permaflex Products Co. 23
*Philadelphia Gear Corp. 6
Pollock Industries, Inc. 164
Porter Electric Co. 164
*Powermatic Mch. Co. 168

R

*Ransburg Electro-Coating Corp. 126
Rosedale Foundry & Machine Co. 167

S

Saint Joseph Lead Co. 127
*Sandvik Steel, Inc. 75
Smith, Thomas Co. 167
Southern Screw Co. 21
Spaulding Fibre Co., Inc. 125
Stanhope, R. C. Inc. 165
Steel Equipment Co. 38
Sunbeam Equipment Corp. 122
Sun Shipbuilding & Dry Dock Co. 142
Sylvania Electric Products, Inc. 130

T

*Texaco Inc. 77
*Thomas Machine Mfg. Co. 142
Tractor & Equipment Co. 164

U

Ulbrich Stainless Steels 149
Union Carbide Corp. Haynes Stellite Div. 40-41
Union Carbide Corp. Linde Co. Div. 59-60
United States Steel Corp. 112
Universal Atlas Cement Div. United States Steel Corp. 112
*Universal-Cyclops Steel Corp. 123
Universal Machinery & Equipment Co. 165

V

Valley Steel Products Co. 166
Vaughn Machinery Co. 107
Verson Allsteel Press Co. Back Cover
Voss Engineering Co. 64

W

*Wales-Strippit Div. Houdaille Industries, Inc. 133
Wallack Bros. 160
Washington Steel Corp. 8
Waterbury-Farrel Foundry & Machine Co. Div., Textron, Inc. 92
Weatherly Foundry & Mfg. Co. 167
Weiss, B. M. Co. 164
Weiss Steel Co. Inc. 166
*Westinghouse Electric Corp. 31-34
Wilcox Forging Corp. 167
*Wilson, Lee, Engineering Co., Inc. Inside Back Cover

Y

*Youngstown Sheet & Tube Co. 134-135

CLASSIFIED SECTION

Clearing House 164-165
Contract Manufacturing Appears in first and third issue of each month. See 167
Employment Exchange 167
Equipment & Materials Wanted 166

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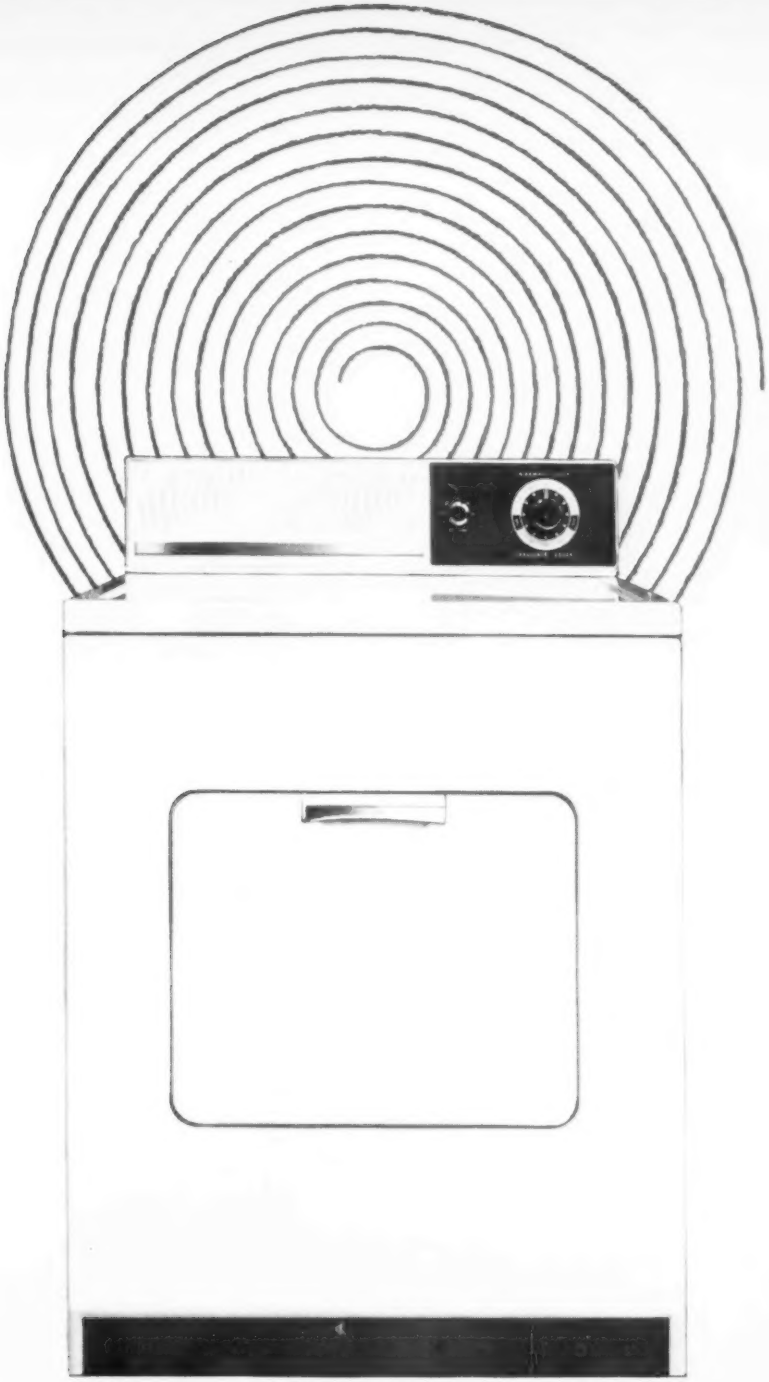

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COOK OUTS and two Verson presses help balance production at Structo Manufacturing Company

Seasonal production problems can be tough and costly. Structo Manufacturing Company, Freeport, Illinois, solved such a problem. As the world's largest manufacturer of heavy gauge steel toys, Structo balanced its production of toys for the Christmas market with the production of barbecue grills for the summer market. Two 350 ton Verson crank presses are the key units in the grill production set up. If you have production balancing problems, talk to your Verson Representative. He will be glad to show you how Verson equipment can help you in balancing production.

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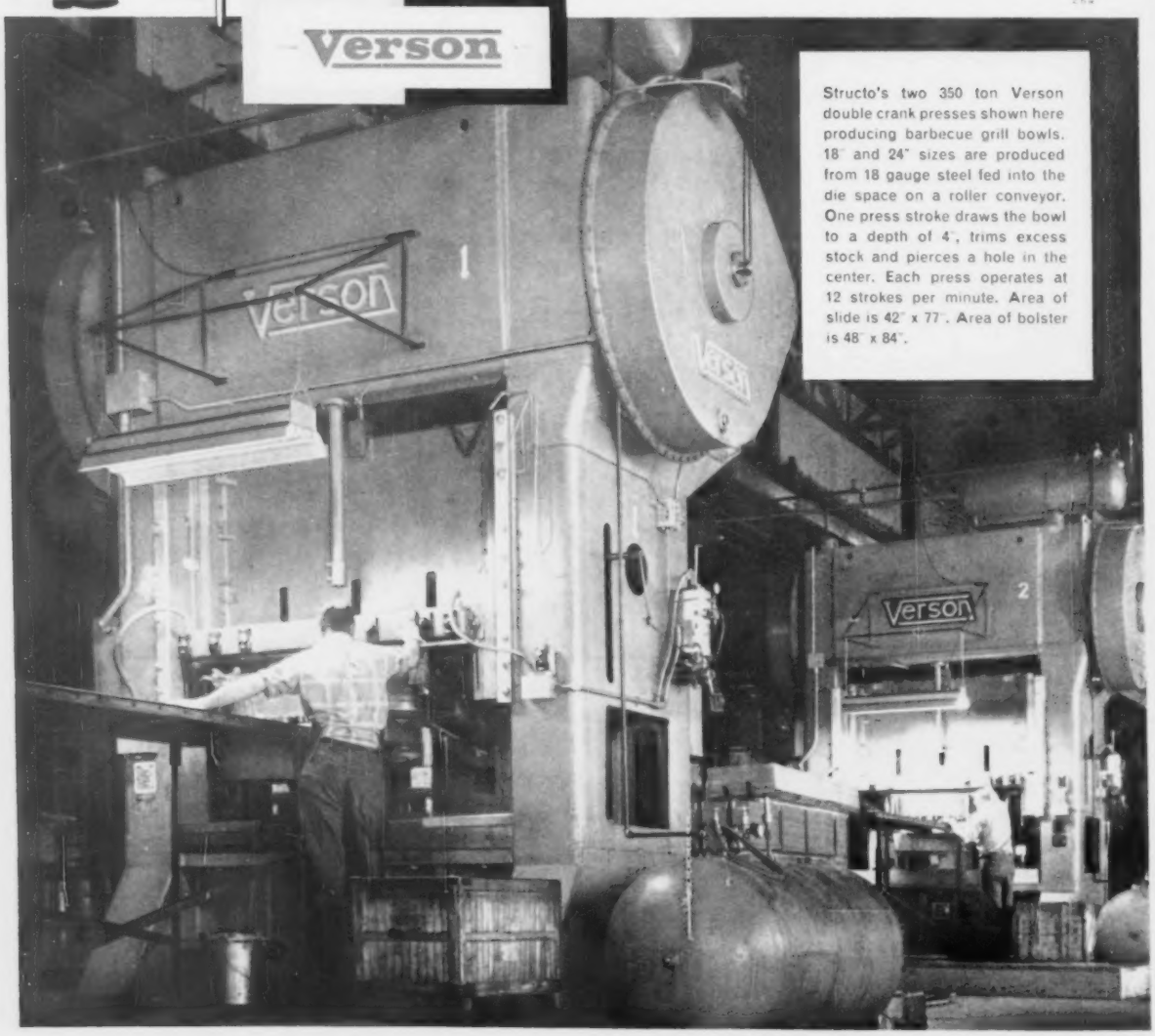

Structo's two 350 ton Verson double crank presses shown here producing barbecue grill bowls. 18" and 24" sizes are produced from 18 gauge steel fed into the die space on a roller conveyor. One press stroke draws the bowl to a depth of 4", trims excess stock and pierces a hole in the center. Each press operates at 12 strokes per minute. Area of slide is 42" x 77". Area of bolster is 48" x 84".